

NUTRITIONAL KNOWLEDGE OF WOMEN WITH BREAST CANCER AND ITS RELATIONSHIP WITH NUTRITIONAL STATUS

Conhecimento nutricional de mulheres com câncer de mama e sua relação com o estado nutricional

El conocimiento nutricional de mujeres con cáncer de mama y su relación con el estado nutricional

Original Article

ABSTRACT

Objective: To assess the nutritional knowledge of women with breast cancer on the diet-disease interface and its association with nutritional status. **Methods:** Observational, cross-sectional and analytical study, conducted between June and September 2011, with 59 women diagnosed with breast cancer, undergoing chemotherapy or radiotherapy treatment, older than 19, who did not receive prior nutritional counseling. Vegetarian women or those whose treatment had been completed more than two years prior to the study were not included. The patients were treated at a cancer care reference center, in Fortaleza-CE. Clinical and socioeconomic data was collected through direct interview and searching in medical records. The assessment of nutritional knowledge (NK) was performed with the Nutrition Knowledge Scale, developed by the National Health Interview Survey Cancer Epidemiology, validated for Brazil, applied by a trained interviewer. Nutritional status was assessed through body mass index (BMI) and waist circumference. Data was analyzed statistically by SPSS 16.0. **Results:** Among 59 patients evaluated, 18 (30.5%) women had a limited knowledge of the diet-disease association. The mean BMI was 29 kg/m² (\pm 4.4) and 47 (79.7%) women presented excessive weight (overweight or obesity). There was no correlation between nutritional knowledge and BMI ($p = 0.64$). Nutrition knowledge scores were similar among patients with overweight and normal weight ($p = 0.89$). **Conclusion:** Women in this study had a limited knowledge of the interface between diet and disease, were overweight, but there was no correlation between their nutritional knowledge and nutritional status.

Descriptors: Breast Cancer; Food and Nutrition Education; Nutritional Status.

RESUMO

Objetivo: Avaliar o conhecimento nutricional de mulheres com câncer de mama sob a interface dieta-doença e sua relação com o estado nutricional. **Métodos:** Estudo observacional, transversal e analítico, realizado entre junho e setembro de 2011 com 59 mulheres diagnosticadas com câncer de mama, em tratamento químico ou radioterápico, maiores de 19 anos, que não receberam orientação nutricional prévia. Não foram incluídas mulheres que fossem vegetarianas ou tivessem finalizado o tratamento há mais de 2 anos. As pacientes eram atendidas num centro oncológico de referência em Fortaleza-CE. Os dados clínicos e socioeconômicos foram coletados mediante entrevista direta e busca em prontuários. A avaliação do conhecimento nutricional (CN) se deu pela aplicação da Escala de Conhecimento Nutricional, desenvolvida pelo National Health Interview Survey Cancer Epidemiology, validada para o Brasil, aplicada por um entrevistador treinado. O estado nutricional foi avaliado através do índice de massa corporal (IMC) e da circunferência da cintura (CC). Os dados foram analisados estatisticamente pelo software SPSS 16.0. **Resultados:** Entre 59 pacientes avaliadas, 18 (30,5%) apresentaram baixo conhecimento sobre a relação dieta-doença. O IMC médio foi 29 kg/m² (\pm 4,4) e 47 (79,7%) tinham excesso de peso (sobrepeso ou obesidade). Não foi verificada correlação entre conhecimento nutricional e IMC ($p=0,64$). Os escores de conhecimento nutricional foram semelhantes entre as pacientes com excesso de peso e as eutróficas ($p=0,89$). **Conclusão:** As mulheres estudadas apresentaram baixo conhecimento sobre a interface dieta-doença, encontravam-se com excesso de peso, mas não mostraram relação entre conhecimento nutricional e estado nutricional.

Descritores: Câncer de Mama; Educação Nutricional; Estado Nutricional.

Karin Sarkis Sedó⁽¹⁾
Carone Alves Lima⁽²⁾
Priscila Carmelita Paiva Dias
Carneiro^(3,4)
Larissa da Silva Albuquerque⁽²⁾
Camila Oliveira de Araújo⁽²⁾
Ádila da Silva Castro⁽²⁾
Sara Maria Moreira Lima
Verde^(1,2)

1) Faculdade de Saúde Pública -
Universidade de São Paulo - FSP/USP -
São Paulo (SP) Brasil

2) Universidade de Fortaleza - UNIFOR -
Fortaleza (CE) - Brasil

3) Universidade Estadual do Ceará- UECE
- Fortaleza (CE) - Brasil

4) Centro Integrado de Oncologia - CRIO -
Fortaleza (CE) - Brasil

Received on: 29/12/2011

Revised on: 10/05/2012

Accepted on: 11/07/2012

RESUMEN

Objetivo: *Evaluar el conocimiento nutricional de las mujeres con cáncer de mama sobre el aspecto dieta-enfermedad y su relación con el estado nutricional.* **Métodos:** *Estudio observacional, transversal y analítico, realizado entre junio y septiembre de 2011 con 59 mujeres con el diagnóstico de cáncer de mama, en tratamiento de quimioterapia o radioterapia, mayores de 19 años y que no recibieron orientación nutricional previa. No fueron incluidas las mujeres que eran vegetarianas o que tuvieran finalizado el tratamiento hace más de 2 años. Las pacientes eran atendidas en un centro de oncología de referencia en Fortaleza-CE. Los datos clínicos y socioeconómicos fueron recogidos a través de una entrevista directa y análisis de las historias clínicas. La evaluación del conocimiento nutricional (CN) se dio con la aplicación de la Escala de Conocimiento Nutricional desarrollada por el National Health Interview Survey Cancer Epidemiology validada para Brasil, aplicada por un entrevistador entrenado para ello. El estado nutricional fue evaluado a través del índice de masa corporal (IMC) y de la circunferencia de la cintura (CC). Los datos fueron analizados estadísticamente por el software SPSS 16.0. Resultados:* *De las 59 pacientes evaluadas, 18 (30,5%) presentaron bajo nivel de conocimiento sobre la relación dieta-enfermedad. El IMC medio fue de 29 kg/m² (±4,4) y 47 (79,7%) tenían exceso de peso (sobrepeso u obesidad). No se verificó la correlación entre el conocimiento nutricional y el IMC (p=0,64). Las puntuaciones del conocimiento nutricional fueron similares en las pacientes con exceso de peso y las eutróficas (p=0,89). Conclusión:* *Las mujeres estudiadas presentaron bajo conocimiento sobre la interface dieta-enfermedad, se presentaron con exceso de peso, pero no mostraron relación entre el conocimiento nutricional y el estado nutricional.*

Descriptor: *Neoplasias de la mama; Educación Alimentaria y Nutricional; Estado Nutricional.*

INTRODUCTION

Breast cancer is the most common malignant neoplasm in women, and 52,000 new cases are estimated for Brazil, in 2012, of which, 8000 are in the Northeast⁽¹⁾.

The relationship between food consumption and the emergence of breast cancer has been widely studied. Diets based on simple carbohydrates, processed foods, cholesterol, saturated and trans fats, associated with a diet with low contents of fiber, poor in antioxidants and high in scorched red meat, have shown to be important risk factor for the development of this disease. Besides, abdominal overweight and weight gain throughout life, especially in adulthood, are strongly associated to an increased risk for this neoplasm, mainly after menopause⁽²⁻⁵⁾. On the other hand, a healthy diet, associated to the suitable weight, could prevent 28% of all breast cancer cases in Brasil⁽²⁾.

Regarded as a leap forward in controlling the cancer, prevention through healthy eating and weight control allows a large range of the population to be protected, including the ones on low incomes.

Nevertheless, one of the greatest challenges currently faced by scientific community and public health policy is related to the effective outreach of such preventive strategy, since, for this, it is necessary to bring detailed, accurate, high-quality information, on a regional basis, culminating in reality and habits changes⁽¹⁾.

In view of this, knowledge about the relationship between food and nutrient intake and cancer development can foster shifts in eating habits and lead to healthy choices, being thus considered an important factor in preventing the disease and controlling of its recurrence. Therefore, to promote healthier eating and protective habits, obtaining knowledge about food and nutrition is seen as a need⁽⁵⁻⁷⁾.

In this context, and considering the importance of diet and nutritional status for the pathogenesis of breast cancer, the aim of this work is to evaluate the nutritional knowledge of women with breast cancer under the diet-disease interface and its relation to the nutritional status.

METHODS

This research was characterized as an observational, cross-sectional analytical study, carried out with women attending an oncology care reference center, in Fortaleza-CE. Were considered eligible for the study 80 patients with clinical and anatomopathological diagnoses of breast cancer, undergoing chemotherapy or radiotherapy treatment, older than 19, who had not received prior nutritional counseling. Vegetarian women or those whose treatment had been completed more than two years up to the study were not included.

Data collection took place between June and September 2011, after signing of the Free and Informed Consent Form by patients. There was a sample loss of 21 women, of whom 12 declined to participate and 09 were unable to finish the interview, leaving a total of 59 patients.

Data collection was performed by searching in medical records and through direct interview, conducted by undergraduate students in Nutrition, properly trained by simulating the application of forms and anthropometric measurements into pairs from the research group. The script for collection comprised socioeconomic data (age, income, education), clinical data (clinical stage and type of treatment), nutritional knowledge (NK) and anthropometric data (body mass index and waist circumference).

The NK assessment was made by the application of Nutritional Knowledge Scale, developed by the National Health Interview Survey Cancer Epidemiology, validated in Brazil⁽⁸⁾. This scale consists of 12 questions: 4 on the relationship between diet and disease; 7 on the fiber and lipids contents in food, and 1 on the amount of fruits and vegetables a person should consume. The maximum score

is 14 points and the variations between 0 and 6 indicate low NK; between 7 and 10, moderate, and above 10, high NK.

For assessment of the nutritional status, the current weight, height, and waist circumference (WC) were used, being the weight measured in platform scales, with capacity of 150 kg (Filizola™), and height assessed with a stadiometer attached to the scale. From weight and height measures, the body mass index (BMI) was calculated, to be used as a parameter for nutritional diagnosis. The WC was assessed using an inelastic and flexible tape measure, just above the navel, and evaluated according to the criteria of the World Health Organization (WHO).

The data was submitted to statistical analysis by using SPSS 16.0. Analysis of the correlation between BMI and NK scores was conducted; the difference between the mean BMI of the groups with high, moderate and low nutritional knowledge was evaluated; in addition, the differences in NK scores between eutrophic patients and those with excess weight were analyzed.

This research obtained approval (204/2010) by the *Comitê de Ética em Pesquisa da Universidade de Fortaleza* (Ethics Committee of the University of Fortaleza) and all the interviewees signed the Free Informed Consent Form, following orientation from *Resolução 196/96* (Resolution 196/96).

Tabela I - Patients' characterization of clinical and socioeconomic aspects. Fortaleza-CE, 2011.

Variable	n	%	
Age	21 – 30	4	6.8
	31 – 40	4	6.8
	41 – 50	15	25.4
	51 – 60	20	33.9
	61 – 70	14	23.7
	71 – 80	2	3.4
Formal schooling (years)	0 – 2	4	6.8
	3 – 5	27	45.8
	6 – 7	4	6.8
	8 ou +	18	30.5
	NI*	6	10.2
Family income	< 1 MW**	14	23.8
	1 – 3 MW**	34	57.6
	> 3 MW**	3	5.1
	NI*	8	13.5
Site of neoplasm	Ductal Carcinoma	44	74.6
	Lobular Carcinoma	3	5.1
	Outros	7	11.9
	NI*	5	8.4
CS***	I	6	10.2
	II	8	13.5
	III	31	52.5
	IV	2	3.4
	NI*	12	20.4
Treatment	Exclusive Chemotherapy	7	11.9
	Chemotherapy + Radiotherapy	19	32.1
	Surgery + Radiotherapy	20	33.9
	Surgery + Chemotherapy	7	11.9
	NI*	6	10.2

* NI = Not informed

** MW = Minimum Wage

*** CS = Clinical Staging

RESULTS

Regarding the socioeconomic characteristics of the studied women, age range from 51 to 60 years was predominant (20 - 33.9%), with 3 to 5 years of formal education (27 - 45.8%) and family income of 1 up to 3 minimum wage (34 - 57.6%). On the clinical characterization of the participants, 44 (74.6%) were diagnosed with ductal carcinoma, 31 (52.5%) were in clinical stage (CS) III, and 20 (33.9%) underwent surgery plus radiotherapy (Table I).

The NK mean score was 7.6 ± 2.6 , indicating a moderate level of knowledge among the patients, in average. However, 18 (30.5%) of the studied patients had scores ranging from 0 to 6, indicating low NK regarding the diet-disease association (Table II).

Table II - Description of patients regarding nutritional knowledge. Fortaleza-CE, 2011.

Nutritional Knowledge (NK)	n	%
High NK	10	17
Moderate NK	31	52,5
Baixo NK	18	30,5

As for the nutritional status, 47 (79.7%) were overweight (or obese) and mean BMI indicated overweight (29 ± 4.4 kg / m²). With regard to the WC, 55 (91.7%) showed that measure exceeding 88 cm, indicating cardiovascular risk associated with obesity, and the mean WC of 94 ± 11.8 cm reinforced that diagnosis (Table III).

Table III - Description of patients regarding nutritional status according to BMI. Fortaleza-CE, 2011.

Nutritional status	n	%
Eutrophic	12	20,3
Overweight	27	45,7
Obesity	20	33,9

With regard to the relationship between variables NK and BMI, there was no significant correlation ($p=0.94$). NK scores also showed no correlation with WC ($p=0.95$).

When evaluating the mean BMI and WC between the groups with low, moderate and high nutritional knowledge, there were no significant differences ($p=0.66$; $p=0.55$).

NK scores were similar between the eutrophic patients and the ones who were overweight ($p=0.645$), as well as between those with and without cardiovascular risk associated with obesity ($p=0.631$).

DISCUSSION

The relation between diet and the development of breast cancer has been widely investigated and important

associations have been described, showing that a decrease in saturated fats, alcohol and red meat intake, whereas an increased consumption of fruits, vegetables, fish and polyunsaturated fats act as protectors. In this context, healthy food choices are key to building a protective feeding among patients with breast cancer in order to prevent recurrence.

Nevertheless, these healthy choices are only made possible through the nutritional knowledge about diet-disease association. Therefore, this study is the first work in the Northeast region that sought to assess the nutritional knowledge of women with breast cancer and its interface with their nutritional status.

Breast cancer, in Brazil, is more prevalent in women aged 40 to 69, the average being of 50.4 years⁽⁴⁾. In different studies involving women with breast cancer^(2,9,10), the age of the participants ranged from 41 to 60 years. This study found similar results, since most patients were aged between 41 and 60. These data reinforce that cancer is an age-related disease, more frequent in older age groups, which are exposed for longer to risk factors such as hormones, smoking, alcohol, improper diet and sedentary lifestyle.

In addition to age, different works investigate the socioeconomic aspects, such as income and education, placing them as variables that may affect the diagnosis of breast cancer. The malignant neoplasm of the breast is more frequent in women who belong to the higher social classes⁽¹¹⁾. However, in the South of Brazil, it was found that the income of women with breast cancer ranged 1-3 minimum wages to 41.4% of them, being less than the minimum wage to 28.3%⁽¹⁰⁾. In this study, it was found that 80% of patients had an income lower than 3 minimum wages.

This study also pointed out that 52.6% of patients had less than 5 years of study. In similar studies^(10,12), 59% and 60% of the evaluated patients studied 1-7 years, respectively. Low socioeconomic status and low education level might indicate greater difficulties in access to diagnostic tests and in the understanding of risk factors and protective measures against the disease development, aspects that may be inferred in belated diagnosis, more advanced disease status and worse prognosis.

Concerning the clinical diagnosis, the findings of the current research were similar to other studies^(9,12), which pointed that the majority of the patients had tumors in ductal location (74.6%). In a study of patients with breast cancer⁽¹²⁾, the researchers also found 60% of their cases in more advanced CS, similarly to the present work. However, other researchers⁽⁹⁾ found that the most common clinical status were I (30%) and II (25%), revealing that most of the patients were diagnosed in early stage. The access to health services might be regarded as determinant to diagnosis in initial phases, what depends on public health policy, but

is also influenced by the patient's socioeconomic level. Considering that the population assessed in this study has low incomes and poor schooling, the diagnoses in more advanced CS are likely to be found. This aspect highlights the need of clarification to the community about self-examination and more frequent revaluations in risk ages.

When the present study evaluated the NK on the diet-disease association, the results show that 50.8% of respondents have moderate nutritional knowledge. A similar work found 61.7% of their patients classified with moderate nutritional knowledge⁽²⁾. The NK can be a determinant of the eating behavior, but not solely, nor promoting immediate changes, but rather, along with factors such as education, beliefs, purchasing power and others. Hence, the fact that the majority of patients present moderate NK does not imply changes in their eating habits and consequent improvements in weight and nutritional status. However, it might be the initial step for such changes, mainly because this population, recently diagnosed with cancer, is eligible to receive nutritional guidelines and modify their diet and lifestyle, having in mind the protection against recurrences.

It is noteworthy that the NK is subject to changes also due to the patient's personal interest, a fact shown in a study comprising 257 women with breast cancer⁽¹³⁾, where 88% (n = 206) showed interest and believed in the relationship between antioxidant nutrients and breast cancer.

Another important point regards the fact that NK is prone to show a strong link with the patient's current eating habits, that is, they can know more about those foods that are included into their routine. Perhaps because they adopt inappropriate food habits, a significant percentage (31.6%) of patients in the present study revealed low nutritional knowledge. However, here stood one of the limitations of the current work, since the participants' food consumption has not actually been evaluated. However, there is room for further investigations to be carried out.

The NK is also associated to income and education level, and these two aspects were indicative of a population of low income and schooling in the present study. Furthermore, the current concern of public health policies, regarding the strategies for breast cancer prevention, are limited to encouraging the practice of methods for early detection of the disease, such as breast self-examination, showing that the knowledge on the modifiable risk factors (for instance, diet) are not widely diffused⁽¹⁴⁾.

Nutritional education strategies might promote an increase in nutritional knowledge and consequent acquisition of healthier eating habits and even render influence on the family. In a recent study of our group, with unpublished data, where patients with breast cancer were engaged in three moments of practices in nutrition education, significant

improvement of nutritional knowledge scores was found after the intervention.

It is essential to point out that the consumption and eating habits have changed in recent years. Individuals who have followed these changes are more obese than those who did not suit this new standard^(6,15).

The above-mentioned issue brings with it a concern because this change is characterized by the incorporation of the Western diet to the eating habits, what has been linked to an increase in the incidence of breast cancer and also contributes to losing control of weight^(5,16,17,18). The current Western dietary pattern is characterized by a high intake of sugar, fat, ready-made and refined foods, eggs, dairy products (with higher fat content), meats, fries, rice, pasta, pizza, canned fish, alcohol, cakes, mayonnaise and butter; on the other hand, there is reduced consumption of wholegrain cereals, legumes, roots, tubers, vegetable crops and fruits.

A diet with frequent consumption of vegetables, fruits, fish and low intake of red meat, cheese and dairy products with high fat content, acts as a protective factor against breast cancer⁽⁵⁾. However, the Brazilian dietary pattern has decreased the consumption of fruits, beans and vegetables and, on the other hand, increased alcohol and foods of animal origin, following a diet that may promote breast neoplasia⁽¹⁹⁾.

The weight gain caused by these improper eating habits, especially during adulthood, has been regarded as a feature likely for breast cancer development, and a reduction in the risk of this malignancy has been demonstrated with the prevention of obesity^(4,20). However, based on BMI, this study found presence of overweight or obesity in 76.3% of patients. Similar findings were reported by other studies^(2,10), where respectively 74.7% and 57.1% of the adult patients evaluated had the same nutritional diagnosis as most patients in the present study, demonstrating, once more, the negative influence of that lifestyle regarding the pathogenesis of breast cancer.

The elevation of BMI after menopause is a risk factor for breast cancer. Moreover, higher BMI showed a positive association with more aggressive histological forms of breast cancer. Associated with this fact, the elevation of this index is related to the rapidity of disease progression, increased risk of recurrence and worse prognosis. For those women with a high BMI, the risk of death from breast cancer is 2.12 times higher^(2,9,10,20).

The mechanisms involved in the pathogenesis of breast cancer and its relation with obesity have been widely studied over the last 10 years. It is believed that the greatest amount of adipose tissue in obese individuals is the triggering factor of these mechanisms due to endocrine

dysfunction exerted by the tissue. Fat cells appear to have a key role in the behavior of the tumor, promoting tissue invasion, metastasis and poor clinical prognosis⁽²¹⁾. Thus, not only weight gain and nutritional diagnosis are sufficient to determine the influence of obesity on breast cancer; the amount of fatty tissue is also crucial in this context.

Given this, and as an aggravation of the patients' nutritional status, in addition to the high BMI, the mean waist circumference was found to be 94cm (± 11.8), with the majority (91.7%) having WC greater than 88 cm, indicating risk of cardiovascular disease associated with obesity. Such measures, associated with a high BMI, increases the risk of developing breast cancer⁽⁴⁾. As in the present work, a study on body fat and food intake, involving women with breast cancer, verified that 62% also had the measure of WC greater than 88cm⁽⁹⁾.

Different studies report that women with a waist circumference greater than 88cm are 2.08 times more likely to develop cancer than women with that measure within the normal limits. They also point the accumulation of body fat located in this region as a risk factor for breast malignancy in premenopausal women. Furthermore, for every 10-cm-increase in waist circumference, the relative risk rises 1.13, showing that the distribution of body fat is positively associated with risk of breast cancer. Such risk elevation in the presence of greater adiposity can be explained by insulin resistance and the development of hyperinsulinemia, resulting in increased IGF-1 (growth factor similar to insulin-1) which induces tumor progression by stimulating cell proliferation and inhibition of apoptosis^(2,10,20).

Increased production of leptin, one adipokine originating from adipocytes, inhibits the enzyme AMP kinase and stimulates the production of phospholipids, contributing to cell proliferation. Leptin also stimulates the enzyme aromatase, which converts androgens into estrogens, leading to increased hormone levels, associated with the development of breast cancer⁽²²⁾. Leptin levels have shown a positive association with higher CS, larger tumor size, lymph nodes involvement and the presence of metastasis.

Understanding the promoting role of obesity and excess adipose tissue in the pathogenesis of breast cancer, the importance of nutrition knowledge on diet-disease association is emphasized. The NK and healthy eating habits are essential for a better prognosis and disease prevention. The moderate NK, in combination with impaired nutritional status and large waist circumference - factors found in this study - may reflect the lack of knowledge concerning the association between specific nutrients or food groups and breast cancer. This idea is reinforced by a study that states the importance of nutritional status and healthy lifestyle not only for the cancer etiology, but for its prevention⁽²³⁾. These

findings show that the women investigated are at high risk of developing breast cancer recurrence.

This fact highlights the need for nutrition education practices with the women investigated and other women with breast cancer who have similar nutritional status. The results found in this study are probably a consequence of the incorporation of Western dietary pattern.

In accordance with this thought, studies^(24,25) state the guidelines for survivors of breast cancer as: healthy diet, no alcohol use, physical activity, proper weight, higher level of education, and lower BMI. These guidelines are positively associated to a healthy lifestyle and to the reduction in complications and comorbidities.

Along with the nutritional knowledge and status of women with breast cancer in this study and the association between these two important features, arises the concern for intervening in this process preventively against disease recurrence. Modifying these dietary risk factors brings benefits in different stages of cancer, inhibiting the progression of the disease. In order to achieve changes in these inappropriate dietary patterns and the consequent disease prevention, it is necessary better understanding of the relation between food and cancer. Additionally, effective strategies are required for weight control, due to the impact of body composition and increased fat tissue on breast cancer⁽⁵⁾.

Other authors^(26,27) support this thought when speaking of the concern of health-related agencies to promote healthier eating habits. Emphasizing that, for successful changes in feeding behavior, it is essential that the work of nutrition education is carried out by a multidisciplinary team, since many factors influence the eating habits.

Nutritional education constitutes an important tool, since it has the ability to improve NK and thus promote healthier eating habits, as well as act in the control and prevention of disease or comorbidities linked to breast cancer, such as overweight and obesity. These findings point to the importance of the permanent insertion of the nutritionist, both in primary health care services and in other levels of care.

Thus, it is suggested that further studies with a larger number of participants are carried out, seeking to evaluate this interface between nutritional knowledge, dietary intake, nutritional status and breast cancer in women from the Brazilian northeastern region, so that health strategies are implemented within the reality of this region.

CONCLUSION

The study revealed that the women investigated had low nutritional knowledge about the interface diet-disease. Regarding the nutritional status, a high incidence

of overweight and obesity was found, according to BMI, and excessive abdominal adiposity was detected in most patients, by measures of WC.

Additionally, there was no significant correlation between BMI and the scores of NK. There were also no correlations between the scores of NK and weight, nor between this and WC. There were no significant differences in weight, BMI and WC between the different groups of nutritional knowledge (high, moderate and low knowledge), besides the fact that scores of NK were similar among patients with different nutritional status and also among those with and without cardiovascular risk associated with obesity.

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First author's address:

Karin Sarkis Sedó
Av. Dr. Arnaldo, 715
Bairro: Cerqueira César
CEP: 01246 - 904 - São Paulo - SP - Brasil
E-mail: ksarkis@usp.br

Mailing address:

Sara Maria Moreira Lima Verde
Universidade de Fortaleza - UNIFOR
Av. Washington Soares, 1321
Bairro: Edson Queiroz
CEP: 60.811-905 - Fortaleza - CE - Brasil
E-mail: saram@unifor.br