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# Nutritional state and anxious and depressive symptoms in oncological patients: comparison between a public and private hospital

Estado nutricional y síntomas ansiosos y depresivos en pacientes oncológicos: comparación entre hospital público y privado

Estado nutricional e sintomas ansiosos e depressivos em pacientes oncológicos: comparação entre um hospital público e outro particular

## ABSTRACT

**Objective:** Identify the nutritional profile and anxious and depressive symptoms of cancer patients in health care networks, public and complementary, and check for possible associations with nutritional status. **Method:** Cross-sectional study, carried out at the university hospital and in a private hospital in Maceió-AL. Weight, height, arm circumference, and calf circumference were measured. To assess the presence of anxious and depressive symptoms, the Hospital Anxiety and Depression Scale was used. **Results:** The mean BMI was higher in the public network group ( $p = 0.02$ ) and the AC in the complementary network group ( $p < 0.01$ ). Nutritional status was also associated with the presence of anxious and depressive symptoms. Anxious symptoms were associated with BMI ( $p < 0.01$ ) and CC ( $p < 0.01$ ). On the other hand, depressives only with BMI ( $p = 0.03$ ). **Conclusion:** There were differences in the nutritional status of patients in the different services, also being associated with symptoms of anxiety and depression.

**DESCRIPTORS:** Nutritional Status; Medical Oncology; Anxiety; Depression.

## RESUMEN

**Objetivo:** Identificar el perfil nutricional y los síntomas ansiosos y depresivos de los pacientes oncológicos en las redes de atención pública y complementarias, y verificar posibles asociaciones con el estado nutricional. **Método:** Estudio transversal, realizado en el hospital universitario y en un hospital privado de Maceió-AL. Se midieron el peso, la altura, la circunferencia del brazo y la circunferencia de la pantorrilla. Para evaluar la presencia de síntomas ansiosos y depresivos se utilizó la Escala Hospitalaria de Ansiedad y Depresión. **Resultados:** El IMC medio fue mayor en el grupo de la red pública ( $p = 0.02$ ) y el CB en el grupo de la red complementaria ( $p < 0.01$ ). El estado nutricional también se asoció con la presencia de síntomas ansiosos y depresivos. Los síntomas de ansiedad se asociaron con el IMC ( $p < 0,01$ ) y la PC ( $p < 0,01$ ). Por otro lado, depresivos solo con IMC ( $p = 0,03$ ). **Conclusión:** Existieron diferencias en el estado nutricional de los pacientes en los diferentes servicios, además de estar asociadas a síntomas de ansiedad y depresión.

**DESCRIPTORES:** Estado Nutricional; Oncología Médica; Ansiedad; Depresión.

## RESUMO

**Objetivo:** Identificar o perfil nutricional e sintomas ansiosos e depressivos de pacientes oncológicos das redes de atenção à saúde, pública e complementar, e verificar possíveis associações com o estado nutricional. **Método:** Estudo transversal, realizado no hospital universitário e em um hospital privado de Maceió-AL. Foram mensurados peso, altura, circunferência do braço e circunferência da panturrilha. Para avaliar a presença de sintomas ansiosos e depressivos utilizou-se a Escala Hospitalar de Ansiedade e Depressão. **Resultados:** A média do IMC foi maior no grupo da rede pública ( $p=0,02$ ) e a CB no grupo da rede complementar ( $p<0,01$ ). O estado nutricional também foi associado à presença de sintomas ansiosos e depressivos. Os sintomas ansiosos foram associados ao IMC ( $p<0,01$ ) e a CP ( $p<0,01$ ). Já os depressivos apenas com o IMC ( $p=0,03$ ). **Conclusão:** Observou-se diferenças no estado nutricional dos pacientes nos diferentes serviços, além de apresentar associações com os sintomas de ansiedade e depressão.

**DESCRIPTORES:** Estado Nutricional; Oncologia; Ansiedade; Depressão.

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## INTRODUCTION

Cancer is the main public health problem in the world and is classified as one of the main causes of premature death, before the age of 70, in most countries.<sup>1</sup> Its incidence and increased mortality rate are on an increasing scale, due to population aging and increased factors predisposing to the onset of the disease, especially those associated with socioeconomic and environmental factors, such as: sedentary lifestyle, inadequate diet, exposure to pollutants, among others.<sup>2</sup>

The most recent world estimate published in 2018 points out that there were 18 million new cases of cancer in the world and 9,6 million deaths due to the disease. Lung cancer being accompanied by breast cancer (2,1 million), colon and rectum (1,8 million) and prostate (1,3 million), the most incident.<sup>2</sup> According to INCA for Brazil, the estimate is that for each year of the 2020-2022 triennium there will be 625 thousand new cases of cancer, with non-melanoma skin cancer being the most in-

cident (177 thousand), followed by breast and prostate cancers (66 thousand each), colon and rectum (41 thousand), lung (30 thousand) and stomach (21 thousand).<sup>1</sup>

Among the problems faced by cancer patients, impaired nutritional status is one of the most frequent, being present in 40-80% of patients throughout the disease. This condition affects around 15-20% of individuals at the time of diagnosis and can reach up to 90% of patients with a more advanced stage of the disease.<sup>3</sup>

The impairment of nutritional status occurs due to metabolic changes caused by the tumor, which competes for nutrients to keep growing and for this leads to abnormalities in the metabolism of macronutrients (carbohydrates, proteins and lipids).<sup>4</sup> We can also associate the type of treatment to which the patient is undergoing, chemotherapy and/or radiotherapy, which have side effects such as nausea, vomiting, stomatitis, mucositis, diarrhea and constipation, which contribute to the decrease in food intake, resulting in deficit energy and negative nitrogen balance.<sup>3,4</sup>

In these conditions, where the decline in nutritional status is one of the most impacting side effects for the patient, psychological symptoms can be triggered due to the perspectives that the individual can develop about his/her chances of cure. Anxiety and depression are the most frequent in this population, which can affect about one third of patients undergoing treatment.<sup>5</sup>

Adverse repercussions such as less adherence to treatment, longer hospital stay, worsening quality of life, worsening prognosis and survival, are more present in individuals who develop symptoms of anxiety and depression.<sup>5,6</sup> A study by the National Comorbidity Survey showed that 51% of patients diagnosed with depression and anxiety manifested exacerbation of symptoms, prolonged recovery time and more readmissions to healthcare.<sup>6</sup>

Given the above, this study aimed to identify the nutritional profile and anxious and depressive symptoms of patients undergoing chemotherapy treatment in hospitals in different health care networks

(public and complementary) in Maceió - AL, as well as to identify and possible associations between characteristic access to health services and the presence of anxious and depressive symptoms with the nutritional status of these patients.

## METHOD

This research was submitted to and approved by Plataforma Brasil and to the Research Ethics Committee of the Federal University of Alagoas - UFAL under number CAAE 52019315.0.0000.5641. This is a cross-sectional study, carried out with patients undergoing adjuvant treatment (chemotherapy) from a university hospital in the public health network and a hospital in the complementary health network in Maceió, from November 2015 to January 2016. The sample consisted of a non-probabilistic convenience sampling plan, with the presence of individuals of both sexes, over the age of 18, diagnosed with cancer in any region, who were undergoing exclusive chemotherapy, and who agreed to sign the term informed consent form (ICF).

Data collection was performed by properly trained undergraduates in nutrition. Structured forms were applied containing sociodemographic and anthropometric variables. Nutritional status was assessed using weight, height, arm circumference (AC) and calf circumference (CC).

To collect the weight, a digital platform scale, calibrated, with a capacity of 200 kg and a resolution of 100 g was used. The individuals were weighed without shoes and without adornments, maintaining an orthostatic position.

For individuals aged 60 years or older, height was estimated from the measurement of knee height, with the aid of a caliper, and applied in a formula, according to Chumlea et al.<sup>7</sup> For the other individuals, height measurement was performed using a vertical, portable, floor-type stadiometer, with a measurement range from 0 to 200 cm and millimeter graduation, with the individual standing, barefoot, touching the occipital region, collarbone,

buttocks, calves and heels on the device, keeping the head (unadorned) upright and with the gaze ahead (horizontal plane of Frankfurt); the cursor was lowered and the obtained value was read.

The body mass index (BMI) was classified by dividing the weight (in kilograms) by the square height (in meters), using the Lipschitz criterion<sup>8</sup>, for individuals aged 60 and over and the classification adopted by the World Health Organization<sup>9</sup> for individuals under the age of 60.

In order to measure CC and AC, an inelastic measuring tape was used for anthropometric measurements (0,1 mm scale). The CP measurement was performed with the individual seated, positioning the leg at a 90° angle and feet flat on the floor, being then considered the point of greatest circumference.

The AC measure was evaluated with the researcher standing behind the individual and asking the individual to flex their elbow 90°, with the palm of the hand facing up. By palpation, the most distal points of the acromion and olecranon were located, the tape was passed and then a small marking of the midpoint between these two ends was made. Still in an upright position, the individual was asked to leave the arm relaxed and extended along the body. At the previously landmark point, the circumference of the arm was measured with subsequent recording of the obtained value.

To assess the presence of anxious and depressive symptoms, the Hospital Anxiety and Depression Scale (HADS) was used, which aims to detect mild degrees of affective disorders in non-psychiatric environments and consists of 14 multiple-choice items, seven of which are aimed at anxiety assessment (HADS-A) and seven for depression (HADS-D).<sup>10</sup>

The collected data were organized in an electronic database in the SPSS (Statistical Package for Social Sciences) version 20.0<sup>9</sup>, which were presented using descriptive frequency statistics and measures of central tendency (mean + standard deviation). The parametric distribution of the samples was evaluated using the Shapiro-Wilk test. All variables analyzed

showed parametric distribution. Student's t-test for independent samples was used to verify the difference between the means of two variables, adopting  $\alpha = 5\%$ .

## RESULTS

The sample consisted of 65 individuals assisted by two hospitals in Maceió, 50,8% (n = 33) coming from a public hospital and 49,2% (n = 32) from a private hospital, with a mean age 54,2 years, one third of these elderly individuals. Comparing individuals from the public hospital vs. private hospital, observed the respective BMI averages  $27,49 \pm 4,62 \text{ kg/m}^2$  vs.  $24,79 \pm 4,05 \text{ kg/m}^2$  (p = 0,02); calf circumference  $34,13 \pm 4,20 \text{ cm}$  vs.  $33,08 \pm 3,05 \text{ cm}$  (p = 0,687); and mean arm circumference of  $27,53 \pm 3,40 \text{ cm}$  vs.  $30,65 \pm 2,77 \text{ cm}$  (p < 0,01); respectively (table 1). The average income between the groups was R \$ 1380,00 vs. R \$ 2011,66 (p = 0,026).

The presence of anxiety symptoms resulting in a probable diagnosis was observed in 50,8% (n=33) of the sample and in relation to depression, 52,3% (n=34) had a possible diagnosis (Table 1).

The mean BMI was higher in the public school group, classifying this group as overweight. While one of the indicators of better muscle reserve, such as AC, presented better results in the group of patients in the complementary health network, showing that the better the income and education, in patients with cancer, the better the self-care with nutritional status and body composition.

The presence of anxious and depressive symptoms was much more frequent among patients undergoing treatment at the private hospital (complementary health network), which is why the following analyzes for assessing nutritional status were highlighted.

Thus, comparing nutritional status between groups of individuals with probable vs. unlikely diagnosis of anxiety, it was observed that the probable diagnosis of anxiety was associated with BMI (p < 0,01), with an average of  $22,08 \text{ kg/m}^2$ , while individuals with an unlikely diagnosis had an average BMI of  $25,26 \text{ kg/m}^2$ . CC also showed an association (p < 0,01), where the group with a probable

Table 1. Socioeconomic and health characteristics of individuals undergoing adjuvant treatment (chemotherapy), according to the characteristics of the health service. Maceió, 2016 (n = 65).

	PUBLIC (N = 33)		PRIVATE (N = 32)		P
	N	%	N	%	
<b>Sex</b>					
Female	22	66,67	22	68,75	0,86 <sup>a</sup>
Male	11	33,33	10	31,25	
<b>Age (years)</b>					
< 60 years	20	60,61	25	78,125	0,13 <sup>a</sup>
≥ 60 years	13	39,39	7	21,875	
<b>Marital Status</b>					
Single/ divorced/ widowed	18	54,55	13	40,625	0,26 <sup>a</sup>
Stable union / Married	15	45,45	19	59,375	
<b>Years of study</b>					
≤ 5 Years	19	57,58	5	15,625	<0,01 <sup>a</sup>
> 5 Years	14	42,42	27	84,375	
<b>Anxiety</b>					
Unlikely	26	78,79	6	18,75	<0,01 <sup>a</sup>
Likely	7	21,21	26	81,25	
<b>Depression</b>					
Unlikely	26	78,79	5	15,625	<0,01 <sup>a</sup>
Likely	7	21,21	27	84,375	
	<b>Average</b>	<b>DP</b>	<b>Average</b>	<b>DP</b>	<b>p</b>
BMI	27,49	4,62	24,79	4,05	0,02 <sup>b</sup>
CC	34,13	4,2	33,08	3,05	0,29 <sup>b</sup>
AC	27,53	3,4	30,65	2,77	<0,01 <sup>b</sup>

DP: standard deviation (desvio padrão); BMI: body mass index ;AC: arm circumference ; CC: calf circumference <sup>a</sup> Pearson Chi-square; <sup>b</sup> T test for independent variables.

Table 2. Classification of the nutritional status of individuals undergoing adjuvant treatment (chemotherapy), according to the characteristics of the health service. Maceió, 2016 (n = 65).

	UNLIKELY ANXIETY		LIKELY ANXIETY		p
	AVERAGE	SD	AVERAGE	SD	
BMI	28,02	4,57	24,26	3,66	< 0,01 <sup>a</sup>
CC	35,02	3,99	32,20	2,86	< 0,01 <sup>a</sup>
AC	28,78	3,9	29,09	3,04	0,74 <sup>a</sup>
	Unlikely depression		Likely depression		p
	Average	SD	Average	SD	
BMI	27,37	4,3	24,98	4,48	0,03 <sup>a</sup>
CC	34,54	4,07	32,71	3,16	0,63 <sup>a</sup>
AC	28,67	3,84	29,21	3,09	0,55 <sup>a</sup>

SD: standard deviation; BMI: body mass index ; AC: arm circumference; CC: calf circumference. T test for independent variables.

diagnosis had an average circumference of 32,20 cm vs 35,02 cm, of the group with an unlikely diagnosis. There was no association in relation to AC (p = 0,74) (table 2).

Regarding the presence of depressive symptoms, the group with a probable diagnosis had a lower BMI (BMI = 22,37 kg/m<sup>2</sup>) than the group with an unlikely diagnosis (BMI = 24,98 kg/m<sup>2</sup>) (p = 0,03). It is not possible to observe a difference between the means of CC and AC, between individuals with or without probable diagnosis (table 2).

## DISCUSSION

Similar results were found by Chabowski et al.<sup>11</sup> in a study of 257 patients with lung cancer, where two thirds of the patients, approximately 65%, were found to have different degrees of depressive and anxiety disorders according to the HADS scale. Still, similar relationships were found between nutritional status and the HADS score, in which the best nutritional status was associated with lower levels of anxiety and depression (r = -0,68; p < 0,001 and r = -0,60; p < 0,001, respectively).

It is worth mentioning that there are several characteristics of cancer and its treatment that can affect the individual's mental and physical balance.<sup>12</sup> Pitman et al.<sup>13</sup> refer that there are two main ways in which depression and anxiety can arise in cancer patients: the processes involved in the biopsychosocial model and the diversity of neuropsychiatric effects specific to certain types of cancer and their treatments.

As for the biopsychosocial environment, depression and anxiety arise most commonly from the patient's psychological reactions to the diagnosis, the losses inherent in the treatment (such as hair loss, decreased sexual function or other organs), expectations regarding their survival and effects on work and social roles, leading to prolonged periods of stress.<sup>14</sup>

In the face of sustained periods of stress, the symptoms of depression and anxiety can arise as a result of physiological effects, such as activation of the hypothalamic-pituitary-adrenal axis. Other stressful situations such as the physical impact and

side effects of conventional chemotherapy (such as vomiting, hair loss, mucositis and peripheral neuropathy) can intensify psychological symptoms.<sup>13</sup>

The poor psychological status of cancer patients can worsen their nutritional status, by decreasing their energy intake, impacting the prognosis and mortality of the disease, due to the association with low quality of life, lower activity level, increased adverse symptoms related to treatment and reduced tumor response to therapy.<sup>15</sup>

In addition, weight loss can occur as a result of the high energy demand caused by inflammation and catabolism of the disease itself or impaired absorption of nutrients due to gastrointestinal obstructions by tumors, dysphagia, pain, anorexia, early satiety, diarrhea, hemorrhoids, anal fissures and changes

in smell and taste, among others.<sup>16</sup>

All of these repercussions that may be present in cancer patients, associated with their metabolic and lifestyle changes, can contribute to weight loss and, consequently, a decrease in BMI, as well as in the calf circumference, the latter being considered as a sensitive indicator of muscle changes in the individual, especially in the elderly, and should be used to monitor these changes.<sup>17</sup>

It is observed, then, that nutrition should act in the direction of health promotion, prevention of other health problems and help in the treatment, seeking to guarantee ways of reaching the nutritional needs of the patient, to preserve weight and body composition, as well as to slow the appearance and progression of cachexia, contributing with guidelines for the control of symptoms,

making it possible to reduce anxiety and increase pleasure and self-esteem.<sup>18</sup>

## CONCLUSION

From the present study, a high frequency of cancer patients with possible/probable diagnosis of anxiety and depression can be identified. The presence of anxious symptoms was associated with impaired nutritional status (assessed by BMI and CC).

Thus, the importance of nutritional and psychological assessment for the early identification of factors that contribute to the worsening of the disease progression of cancer patients is emphasized, aiming at improving treatment management and improving the quality of life of the same, as well as a better response to the proposed treatment. ■

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