Larissa Cabral dos Santos[1]
Marcella Campos Lima da Luz[1]
Cláudia Porto Sabino Pinho[1]
Aline Rafaelly Apolônio da Silva[1]

[1] Universidade Federal de Pernambuco, Hospital das Clínicas. Recife, PE, Brasil.

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Correspondence
Larissa Cabral dos Santos
cabral.lari2@gmail.com

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Renata Brum Martucci

Sarcopenia and quality of life in hospitalized patients with hematologic neoplasms

Sarcopenia e qualidade de vida em pacientes hospitalizados com neoplasias hematológicas

Abstract

Introduction: Hematologic neoplasms, together with antineoplastic treatments, may lead to alterations in body composition, increasing the risk of sarcopenia and compromising quality of life. *Objective*: To assess the association between sarcopenia and quality of life in hospitalized patients with hematologic neoplasms. *Methods*: This cross-sectional study included adult and older patients hospitalized at the Hospital das Clínicas da Universidade Federal de Pernambuco (Hospital das Clínicas of the Federal University of Pernambuco) in 2024, with a diagnosis of hematologic neoplasm. Demographic, clinical, nutritional, and quality-of-life variables were collected. Sarcopenia was diagnosed using low arm muscle circumference combined with low handgrip strength. Quality of life was assessed using the cancer-specific questionnaire Functional Assessment of Cancer Therapy – General (FACT-G), in which higher scores indicate better quality of life; patients in the lowest tertile were classified as having poorer quality of life. *Results*: The sample included 35 patients, with a mean age of 55.0 ± 15.8 years. Sarcopenia was identified in 28.6% of participants, while low quality of life was observed in 34.3%, with a median score of 72.0 points. Sarcopenia was associated with quality of life with borderline significance ($p = 0.053$). *Conclusion*: The presence of sarcopenia and low quality of life were relevant findings, highlighting the need for longitudinal studies with larger samples to achieve more robust conclusions about the role of sarcopenia in the quality of life of this population.

Keywords: Sarcopenia. Hematologic neoplasms. Quality of life. Nutritional status.

Resumo

Introdução: As neoplasias hematológicas, associadas aos tratamentos antineoplásicos, podem desencadear alterações na composição corporal, aumentando o risco de sarcopenia e comprometimento da qualidade de vida. *Objetivo*: avaliar a associação entre sarcopenia e qualidade de vida em pacientes hospitalizados com neoplasias hematológicas. *Método*: Estudo transversal, com pacientes adultos e idosos, de ambos os sexos, internados no Hospital das Clínicas da Universidade Federal de Pernambuco, no ano de 2024, com diagnóstico de neoplasia hematológica. Foram coletadas variáveis

demográficas, clínicas, nutricionais e de qualidade de vida. O diagnóstico de sarcopenia foi estabelecido quando os indivíduos apresentaram circunferência muscular do braço e força de preensão palmar reduzidas. Para avaliar a qualidade de vida foi utilizado o questionário específico para pacientes com câncer, o The Functional Assessment ofCancerTherapy – General, onde quanto maior foi a pontuação, melhor foi a qualidade de vida, sendo o grupo do menor tercil classificado como pior qualidade de vida. *Resultados*: a amostra foi composta por 35 pacientes, com média de idade 55,0±15,8. A sarcopenia foi encontrada em 28,6% dos indivíduos e a baixa qualidade de vida, por sua vez, foi observada em 34,3% dos pacientes, com mediana de 72,0 pontos. Houve associação no limiar da significância estatística entre a sarcopenia e qualidade de vida (p=0.053). *Conclusão*: A presença de sarcopenia e a baixa qualidade de vida foram achados importantes, fazendo-se necessário outros estudos, com caráter longitudinal e com amostras maiores para alcançar conclusões mais precisas sobre o papel da sarcopenia na qualidade de vida nessa população.

Palavras-chave: Sarcopenia. Neoplasia. Qualidade de Vida. Estado Nutricional.

INTRODUCTION

Hematologic cancers, such as Hodgkin (HL) and non-Hodgkin lymphomas (NHL), leukemias, multiple myeloma, and other myeloproliferative diseases, are a heterogeneous group of malignant disorders that differently impair the function of the bone marrow and lymphoid organs, thereby altering the production and function of hematopoietic cells.[1]

Patients with hematologic neoplasms have an increased risk of malnutrition,[2] in addition to the antineoplastic treatments, which are frequently associated with nutritional impairments.[3] The incidence of weight loss at diagnosis is estimated at 30-40% in HL and acute non-lymphocytic leukemias, and 50–60% in more aggressive forms of NHL.[2]

Reduced appetite, metabolic abnormalities, and symptoms related to antineoplastic treatment are the most prevalent factors related to malnutrition development.[4] Disease-related malnutrition is a condition resulting from the activation of systemic inflammation, which aggravates anorexia, catabolism, and muscle mass loss, leading to weight loss, changes in body composition, and progressive decline in functional capacity and performance.[5]

Reduced muscle strength contributes to functional impairments and dependency, decreasing autonomy in activities of daily living.[6] When muscle mass loss occurs concomitantly with reduced muscle strength (i.e., sarcopenia), the risk of adverse events increases, including falls, fractures, physical disability, and mortality,[6] collectively impacting quality of life (QoL). Although frequently observed in older adults, sarcopenia may occur at any age,[7] particularly in the presence of underlying oncological conditions.

A systematic review evaluating the use of bioelectrical impedance analysis (BIA) for detecting muscle mass (MM) in adults with cancer reported a mean prevalence of sarcopenia of 36% among patients with hematologic neoplasms.[8] In contrast, another systematic evidence found a prevalence ranging from 18.1% to 67.9%.[9]

Growing studies on malnutrition and sarcopenia have emphasized their association with reduced survival, lower treatment tolerance, and poorer QoL in patients with cancer.[10] The World Health Organization (WHO) has defined QoL as "an individual's perception of their position in life in the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards and concerns".[11] The Functional Assessment of Cancer Therapy – General (FACT-G) stands out for being specific to cancer, among the methods to estimate health-related quality of life (HRQoL). FACT-G consists of 27 items addressing general aspects that influence patients' QoL. Despite this advancement, few studies have used this tool.[12] Thus, we believe that the relationship between sarcopenia and QoL in onco-hematologic patients remains underexplored. Therefore, this study aimed to evaluate the association between sarcopenia and QoL in hospitalized patients with hematologic neoplasms.

METHODS

This was a cross-sectional study with a non-probabilistic sample, including consecutive adult and older patients, diagnosed with hematologic neoplasms and hospitalized at the Hospital das Clínicas da Universidade Federal de Pernambuco (HC-UFPE); (Hospital das Clínicas of the Federal University of Pernambuco). Data were collected between April and September 2024. Inclusion criteria were patients aged ≥ 20 years, males or females, with a confirmed diagnosis of hematologic neoplasm, and hospitalized at our

hospital during the study period. Exclusion criteria were cognitive impairment, generalized edema, and limb amputation.

A total of 35 participants were recruited from a pool of 80 patients with hematologic neoplasms under follow-up at the institution. Post-hoc power analysis indicated an 80% study power to detect a sarcopenia prevalence of 16.7%.[13]

Demographic data (i.e., age, sex, and education in years) and clinical data (i.e., diagnosis, time since diagnosis, type of treatment, comorbidities, and hospital readmissions) were obtained through patient interviews or extracted from medical records. Nutritional variables were measured whenever clinically feasible, with all data recorded in a standardized form.

Nutritional assessment included current weight (CW), height, body mass index (BMI), usual weight (UW), weight loss (WL), arm circumference (AC), and triceps skinfold thickness (TSF). Nutritional status was classified according to BMI using WHO (1995) criteria for adults [14] and Lipschitz (1994) criteria for older adults.[15] TSF was measured three times, and the mean value was used for analysis.[16] Both AC and TSF were measured according to the methodology of Lohman et al.,[17] then classified using Blackburn's criteria,[18] and adjusted based on the 50th percentile values established by Frisancho.[19] Percentage WL (%WL) was calculated as the relative difference between UW and CW. For analysis, BMI, AC, and TSF were dichotomized as malnourished vs. non-malnourished, and %WL as $< 10\%$ or $\geq 10\%$.

Muscle strength was assessed using the handgrip strength (HGS) test, following the procedures recommended by the American Society of Hand Therapists (ASHT).[20] For adults, low muscle strength was defined according to the HGS reference values proposed by Amaral et al.,[21] who defined that values below the 10th percentile would be indicative of low strength. For older adults, we adopted the cut-off points recommended by the European Working Group on Sarcopenia in Older People (EWGSOP2)[6]: low strength if HGS <27 kg/f for males, and <16 kg/f for females. Muscle mass was estimated by calculating the arm muscle circumference (AMC), derived from AC and TSF values. AMC's classification was also based on Blackburn's criteria,[18] following the 50th percentile values established by Frisancho.[19]

Sarcopenia was identified in patients presenting with both low HGS and low AMC, based on the EWGSOP 2's criterion.[6]

QoL was assessed using the FACT-G, a cancer-centered questionnaire, composed of 27 items addressing general aspects that influence patient well-being. The instrument contains four domains: physical well-being, social/family well-being, emotional well-being, and functional well-being (figure 1). The maximum possible score is 108 points, with higher scores indicating better QoL.[12] Scores were stratified into tertiles, and the lowest tertile was defined as poor QoL perception.

Figure 1. Questionnaire FACT-G

PHYSICAL WELL-BEING	Not at all	A little bit	Somewhat	Quite a bit	Very much
GP1	I have a lack of energy	0	1	2	3	4
GP2	I have nausea	0	1	2	3	4
GP3	Because of my physical condition, I have trouble meeting the needs of my family	0	1	2	3	4
GP4	I have pain	0	1	2	3	4
GP5	I am bothered by side effects of treatment	0	1	2	3	4
GP6	I feel ill	0	1	2	3	4
GP7	I am forced to spend time in bed	0	1	2	3	4

SOCIAL/FAMILY WELL-BEING	Not at all	A little bit	Somewhat	Quite a bit	Very much
GS1	I feel close to my friends	0	1	2	3	4
GS2	I get emotional support from my family	0	1	2	3	4
GS3	I get support from my friends	0	1	2	3	4
GS4	My family has accepted my illness	0	1	2	3	4
GS5	I am satisfied with family communication about my illness	0	1	2	3	4
GS6	I feel close to my partner (or the person who is my main support)	0	1	2	3	4
Q1	Regardless of your current level of sexual activity, please answer the following question. If you prefer not to answer it, please mark this box and go to the next section.	☐				
GS7	I am satisfied with my sex life	0	1	2	3	4

EMOTIONAL WELL-BEING	Not at all	A little bit	Somewhat	Quite a bit	Very much
GE1	I feel sad	0	1	2	3	4
GE2	I am satisfied with how I am coping with my illness	0	1	2	3	4
GE3	I am losing hope in the fight against my illness	0	1	2	3	4
GE4	I feel nervous	0	1	2	3	4
GE5	I worry about dying	0	1	2	3	4
GE6	I worry that my condition will get worse	0	1	2	3	4

FUNCTIONAL WELL-BEING	Not at all	A little bit	Somewhat	Quite a bit	Very much
GF1	I am able to work (include work at home)	0	1	2	3	4
GF2	My work (include work at home) is fulfilling	0	1	2	3	4
GF3	I am able to enjoy life	0	1	2	3	4
GF4	I have accepted my illness	0	1	2	3	4
GF5	I am sleeping well	0	1	2	3	4
GF6	I am enjoying the things I usually do for fun	0	1	2	3	4
GF7	I am content with the quality of my life right now	0	1	2	3	4

SOURCE: Barbato M, et al. Predictors of quality of life in patients with skin melanoma at the Dermatology Department of the Porto Alegre Teaching Hospital. An Bras Dermatol. 2011;86(2):249-56.

The study was approved by the Research Ethics Committee for studies involving human subjects of the HC-UFPE hospital complex, in accordance with Resolution No. 466/2012 of the Conselho Nacional de Saúde/Ministério da Saúde (National Health Council/Ministry of Health), under CAAE number 77612924.3.0000.8807. All participants signed an Informed Consent Form.

Data were organized in Microsoft Excel and analyzed using the Statistical Package for the Social Sciences (SPSS, version 13). The normality of continuous variables was tested using the Kolmogorov-Smirnov test. Results were expressed as medians and interquartile ranges, and comparisons were made using the non-parametric Mann-Whitney U test, considering the non-normal distribution of our data. Spearman's correlation coefficient was applied to examine the relationship between QoL scores and nutritional variables. Data were presented in tables, and Fisher's exact test was used to verify differences in proportions. Statistical significance was set at $p < 0.05$.

RESULTS

Our study included 35 patients, with a mean age of 55.0 ± 15.8 years and a balanced distribution between sexes. The most prevalent diagnosis was NHL (40.0%). A time since diagnosis of less than one year was observed in 54.3% of patients, and 68.6% were undergoing chemotherapy. Regarding comorbidities, diabetes was present in 40.0% of the sample. For anthropometric variables, malnutrition was identified in 11.4% of patients according to BMI, 57.1% according to AC, 51.4% according to TSF, and 45.7% according to AMC. Weight loss ≥ 10% was observed in 56.3% of participants, and 45.7% presented with low muscle strength based on the HGS test. Sarcopenia was confirmed in 28.6% of the sample. In terms of QoL, 34.3% of patients were classified as having poorer QoL, with a median FACT-G score of 72.0 points (61.5-76.0) (Table 1).

Table 1. Demographic, clinical, and nutritional characteristics of patients with hematologic neoplasms hospitalized at the Hospital das Clínicas da Universidade Federal de Pernambuco (Recife, Brazil), 2024.

Variables	N	%	95% CI
Sex			
Males	18	51.4	35.6-67.0
Females	17	48.6	33.0-64.4
Age group			
Adults	20	57.1	40.9-72.0
Older adults	15	42.9	28.0-59.1
Years of school			
< 9 years	17	48.6	33.0-64.4
≥ 9 years	18	51.4	35.6-67.0
Diagnosis			
NHL	14	40	25.6-56.4
HL	4	11.4	4.5-26.0
MM	8	22.9	12.1-39.0
Others	9	25.7	14.2-42.1
Time since diagnosis			
< 1 year	19	54.3	38.2-69.5
≥ 1 year	16	45.7	30.5-61.8
Treatment modality			
Chemotherapy	24	68.6	52.0-81.5
No treatment	11	31.4	18.6-48.0
SAH			
No	23	65.7	49.2-79.2
Yes	12	34.3	20.8-50.9

Table 1. Demographic, clinical, and nutritional characteristics of patients with hematologic neoplasms hospitalized at the Hospital das Clínicas da Universidade Federal de Pernambuco (Recife, Brazil), 2024.(Continues)

Variables	N	%	95% CI
DM			
No	21	60	43.6-74.5
Yes	14	40	25.6-56.4
Re-hospitalization			
No	21	60	43.6-74.5
Yes	14	40	25.6-56.4
BMI			
Malnutrition	4	11.4	4.5-26.0
No malnutrition	31	88.6	74.1-95.5
%WL			
< 10%	14	43.8	25.6-56.4
≥ 10%	18	56.3	35.6-67.0
AC			
Malnutrition	20	57.1	40.9-72.0
No malnutrition	15	42.9	28.0-59.1
TSF			
Malnutrition	18	51.4	35.6-67.0
No malnutrition	17	48.6	33.0-64.4
AMC			
Malnutrition	16	45.7	30.5-61.8
No malnutrition	19	54.3	38.2-69.5
HGS			
Low	16	45.7	30.5-61.8
Normal	19	54.3	38.2-69.5
Sarcopenia			
No	25	71.4	55.0-83.7
Yes	10	28.6	16.3-45.1
Quality of life			
Worse (1st tertile: <67.0)	12	34.3	20.8-50.9
Better (≥ 2nd tertile: >67.0)	23	65.7	49.2-79.2

Abbreviations: NHL: Non-Hodgkin Lymphoma; HL: Hodgkin Lymphoma; MM: Multiple Myeloma; SAH: Systemic Arterial Hypertension; DM: Diabetes Mellitus; BMI: Body Mass Index; %WL: Percentage of Weight Loss; AC: Arm Circumference; TSF: Triceps Skinfold Thickness; AMC: Arm Muscle Circumference; HGS: Handgrip Strength; 95%CI: 95% Confidence Interval.
Source: Authors, 2024.

Regarding the association between demographic, clinical, nutritional, and QoL variables with sarcopenia, as shown in Table 2, a significant association was observed with nutritional status according to BMI (p = 0.004) and AC (p = 0.001). Time since diagnosis (p = 0.058), %WL $\geq$ 10% (p = 0.073), and QoL (p = 0.053) showed a trend toward association with sarcopenia, with borderline significance (Table 2).

Table 2. Associations of demographic, clinical, nutritional, and quality-of-life variables with sarcopenia in patients with hematologic neoplasms hospitalized at the Hospital das Clínicas da Universidade Federal de Pernambuco (Recife, Brazil), 2024.

Variables	Sarcopenia		
	No (n=25) n (%)	Yes (n=10) n (%)	p-value*
Sex			0.155
Males	11 (61.1)	7 (38.9)	
Females	14 (82.4)	3 (17.6)	
Age group			0.433
Adults	15 (75.0)	5 (25.0)	
Older adults	10 (66.7)	5 (25.0)	
Years of school			0.109
< 9 years	10 (58.8)	7 (41.2)	
≥ 9 years	15 (83.3)	3 (16.7)	
Time since diagnosis			0.058
< 1 year	11 (57.9)	8 (42.1)	
≥ 1 year	14 (87.5)	2 (12.5)	
Treatment modality			0.138
Chemotherapy	19 (79.2)	5 (20.8)	
No treatment	6 (54.5)	5 (45.5)	
SAH			0.530
No	16 (69.6)	7 (30.4)	
Yes	9 (75.0)	3 (25.0)	
DM			0.348
No	16 (76.2)	5 (23.8)	
Yes	9 (64.3)	5 (35.7)	
Re-hospitalization			0.125
No	13 (61.9)	8 (38.1)	
Yes	12 (85.7)	2 (14.3)	
BMI			0.004
Malnutrition	0 (0)	4 (100.0)	
No malnutrition	25 (80.6)	6 (19.4)	
%WL			0.073
< 10%	12 (85.7)	2 (14.3)	
≥ 10%	10 (55.6)	8 (44.4)	
AC			0.001
Malnutrition	10 (50.0)	10 (50.0)	
No malnutrition	15 (100.0)	0 (0)	
TSF			0.604
Malnutrition	13 (72.2)	5 (27.9)	
No malnutrition	12 (70.6)	5 (29.4)	
Quality of life			0.053
Worse (1st tertile: <67.0)	6 (50.0)	6 (50.0)	
Better (≥ 2nd tertile: >67.0)	19 (82.6)	4 (17.4)	

Abbreviations: SAH: Systemic Arterial Hypertension; DM: Diabetes Mellitus; BMI: Body Mass Index; %WL >10%: Percentage of Weight Loss >10%; AC: Arm Circumference; TSF: Triceps Skinfold Thickness.
*Fisher's exact test
Source: Authors, 2024.

When comparing the median QoL scores and their subdomains according to the presence of sarcopenia, equivalent values were observed between groups with and without sarcopenia, with overall medians of 73.0 (67.2-75.6) and 65.0 (59.7-79.2), respectively (Table 3).

Table 3. Comparative analysis of quality-of-life scores and their subdomains according to the presence or absence of sarcopenia in patients hospitalized with hematologic neoplasms at the Hospital das Clínicas da Universidade Federal de Pernambuco (Recife, Brazil), 2024.

	Sarcopenia				
	No		Yes		
Quality of life domains	Median	IQR	Median	IQR	p-value*
QoL 1	17.0	(14.0-19.0)	17.0	(12.8-18.5)	0.872
QoL 2	20.0	(18.0-21.5)	18.7	(14.8-21.6)	0.240
QoL 3	18.0	(15.0-19.0)	17.5	(15.0-21.3)	0.957
QoL 4	18.0	(15.5-19.5)	17.0	(15.5-20.3)	0.627
Total QoL	73.0	(67.2-75.6)	65.0	(59.7-79.2)	0.439

QoL 1: Physical well-being; QoL 2: Social/family well-being; QoL 3: Emotional well-being; QoL 4: Functional well-being; Total QoL: Overall quality of life; IQR: interquartile range.
*Mann-Whitney U test
Source: Authors, 2024.

No significant correlations were found between global QoL scores and anthropometric variables, nor HGS (Table 4).

Table 4. Correlation between nutritional variables and quality-of-life scores and their subdomains in patients with hematologic neoplasms hospitalized at the Hospital das Clínicas da Universidade Federal de Pernambuco (Recife, Brazil), 2024.

Variable	Quality of life									
	Q1		Q2		Q3		Q4		QT	
	rho	p*	rho	p*	rho	p*	rho	p*	rho	p*
BMI	-0.176	0.311	0.215	0.214	-0.014	0.938	0.292	0.088	0.144	0.408
%WL	0.062	0.727	0.021	0.906	0.084	0.637	-0.093	0.600	0.003	0.988
AC	-0.160	0.358	0.173	0.321	0.018	0.919	0.292	0.089	0.155	0.373
TSF	-0.081	0.643	0.152	0.382	-0.098	0.576	0.213	0.219	0.155	0.373
AMC	-0.149	0.392	0.189	0.277	0.034	0.846	0.250	0.147	0.126	0.472
HGS	0.058	0.743	0.101	0.563	0.207	0.243	0.055	0.756	0.164	0.346

Abbreviations: Q1: Physical well-being; Q2: Social/family well-being; Q3: Emotional well-being; Q4: Functional well-being; TQoL: Total quality of life; BMI: Body Mass Index; %WL: Percentage of Weight Loss; AC: Arm Circumference; TSF: Triceps Skinfold Thickness; AMC: Arm Muscle Circumference; HGS: Handgrip Strength.
*Spearman's correlation
Source: Authors, 2024.

When QoL scores were stratified into tertiles, poorer QoL was observed among patients with <9 years of education (p = 0.004) and among those not undergoing chemotherapy (p = 0.019). No association was found between QoL and nutritional variables (Table 5).

Table 5. Association between demographic, clinical, and nutritional variables and quality of life in patients with hematologic neoplasms hospitalized at the Hospital das Clínicas da Universidade Federal de Pernambuco (Recife, Brazil), 2024.

Variables	Quality		
	Worse (1st tertile: <67) N = 12	Better (≥ 2nd tertile ≥67) N=23	p-value*
Sex			0.316
Males	5 (27.8)	13 (72.2)	
Females	7 (41.2)	10 (58.8)	
Age group			0.397
Adults	6 (30.0)	14 (70.0)	
Older adults	6 (40.0)	9 (60.0)	
Years of school			0.004
< 9 years	10 (58.8)	7 (41.2)	
≥ 9 years	2 (11.1)	16 (88.9)	
Time since diagnosis			0.242
< 1 year	8(42.1)	11 (57.9)	
≥1 year	4 (25.0)	12 (75.0)	
Treatment modality			0.019
Chemotherapy	5 (20.8)	19 (79.2)	
No chemotherapy	7 (63.6)	4 (36.4)	
SAH			0.327
No	9 (39.1)	14 (60.9)	
Yes	3 (25.0)	9 (75.0)	
DM			0.109
No	5(23.8)	16 (76.2)	
Yes	7 (50.0)	7 (50.0)	
BMI			0.106
Malnutrition	3 (75.0)	1 (25.0)	
No malnutrition	9 (29.0)	22 (71.0)	
%WL			0.410
< 10%	4 (28.6)	10 (71.4)	
≥ 10%	7 (38.9)	11 (61.1)	
AC			0.118
Malnutrition	9 (45.0)	11 (55.0)	
No malnutrition	3 (20.0)	12 (80.0)	
TSF			0.172
Malnutrition	8 (44.4)	10 (55.6)	
No malnutrition	4 (23.5)	13 (76.5)	

Abbreviations: SAH: Systemic Arterial Hypertension; DM: Diabetes Mellitus; BMI: Body Mass Index; %WL >10%: Percentage of Weight Loss >10%; AC: Arm Circumference; TSF: Triceps Skinfold Thickness.
*Fisher's exact test
Source: Authors, 2024.

DISCUSSION

Our results showed that nearly 30% of the sample presented with sarcopenia. Of these, 100% of individuals were classified as malnourished by BMI, and 50% were classified as malnourished by AC. In line with our findings, Sun et al.[22] reported sarcopenia in 18.1% of patients in a study exploring the prognostic value of sarcopenia in patients with acute myeloid leukemia (AML) and developing a new prognostic model. Similarly, Kasahara et al.[23] found sarcopenia in 35% of the patients when investigating the effects of exercise therapy on physical function and QoL in patients aged 70 years or older with NHL undergoing chemotherapy. Furthermore, previous studies using BIA and computed tomography (CT) reported sarcopenia prevalence rates of 36% using BIA,[24] and ranging from 24.6%[25] to 54.9%[26] using CT.

In our sample, most patients were undergoing chemotherapy. Although no significant association was observed between chemotherapy and sarcopenia, previous studies have shown that chemotherapy may affect muscle metabolism through uncontrolled muscle protein catabolism, potentially contributing to the onset or worsening of sarcopenia.[27] Studies have also highlighted that adverse events during chemotherapy, including nausea, vomiting, loss of appetite, and fatigue, may negatively impact food intake and physical activity, thereby contributing to substantial muscle mass loss.[28] This, in turn, may lead to poorer nutritional status, unfavorable prognosis, and reduced QoL.

Late complications in HL survivors have been described as one of the main causes of reduced life expectancy and impaired QoL, with these complications being related to specific treatments (radiotherapy or chemotherapy) or particular drug classes.[29] Youron et al.[30] evaluated QoL in patients with chronic lymphocytic leukemia (CLL) and found significantly impaired QoL across all functional domains, including global health, when compared with a control group of individuals without CLL.

The present analysis identified a borderline significance for the association between sarcopenia and QoL in patients with hematologic cancer (p = 0.053). Medeiros et al.[31] explored the effects of sarcopenia and cachexia on QoL in patients with gastrointestinal cancer during their first cycle of chemotherapy and found no significant differences in QoL between patients with and without sarcopenia. Nonetheless, declines were observed in most domains of the QoL questionnaire used (European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 – EORTC QLQ-C30), with only the global health score and the social functioning score showing statistically significant differences between the beginning and end of the chemotherapy cycle. Gharagozlian et al.[32] reported a high prevalence of weight loss and pre-sarcopenia, with malnutrition being associated with more gastrointestinal symptoms and lower QoL scores, in a study assessing nutritional status, sarcopenia, gastrointestinal symptoms, and QoL in patients after gastrectomy for cancer.

The small sample size in our study may have limited the statistical power to detect significant differences in the association between sarcopenia and QoL. As Bland M.[33] highlights, the interpretation of scientific evidence and results should not be restricted to the conventional threshold of considering differences significant only when the probability is less than 0.05. While this value serves as a reasonable guideline, it should not be regarded as an absolute demarcation. It is highly likely that the inclusion of additional participants in the study would have allowed statistical significance to be reached. Moreover, most patients in our sample had a recent diagnosis (<1 year) and were likely in the early stages of treatment, making it difficult to fully observe the adverse effects of sarcopenia on QoL. It is also possible that other variables not assessed in this study, such as the patients' current chemotherapy cycle, may have greater explanatory power.

Similar to QoL, when evaluating %WL $\geq$ 10% in association with sarcopenia, a trend toward statistical significance was observed (p = 0.073). Mancuso et al.[34] reported that WL across different types of cancer is associated with poor prognosis, reduced QoL, lower levels of physical activity, increased treatment-related adverse symptoms, and decreased tumor response to therapy. Our additional findings showed a borderline significant association between time since diagnosis and sarcopenia (p = 0.058). This may be explained by patients likely being in the acute phase of the disease. Casari et al.[35] noted that increased production of catabolic substances and hormones, inflammatory mediators, and acute-phase proteins leads to disruption of body homeostasis and worsening of QoL.

In our sample, AMC, an indicator of muscle mass, showed no correlation with overall QoL scores or their subdomains. By contrast, evidence from a systematic review and meta-analysis by Anabtawi et al.[36]

demonstrated that low skeletal muscle mass in adults with hematologic malignancies is associated with reduced overall survival, shorter progression-free survival, and higher non-relapse mortality. These findings highlight that while our study did not identify such an association, previous research consistently points to the prognostic relevance of muscle mass. Accordingly, QoL assessment is understood not only as a reflection of disease impact but also as an independent predictor of survival and treatment response in cancer.[37]

Nearly half of our sample was classified as malnourished according to AMC. This finding underscores the relevance of AMC as a practical indicator of nutritional status in hematologic malignancies. Qui et al.[38] reported that AMC reflects both muscle mass and performance and has been used as a valuable tool for evaluating patient outcomes in this context. Studies also indicate that low skeletal muscle mass functions as a prognostic marker across many diseases. This association is thought to occur because prolonged bed rest can substantially reduce skeletal muscle mass without affecting lipid stores, leading to metabolic phenotype changes such as reduced resting fat oxidation, lower basal metabolic rate, impaired glucose tolerance, and decreased insulin sensitivity.[38]

Low muscle strength was identified in 45.7% of our sample. This finding aligns with observations by Kasahara et al.[23] who reported significantly lower HGS at discharge compared with admission, when comparing HGS, knee extensor strength, six-minute walk test, body composition, nutritional status, fatigue, and health-related QoL in patients with NHL at admission and discharge. As with low skeletal muscle mass, prolonged bed rest is believed to contribute to this decline in muscle strength among patients with hematologic neoplasms.

In our study, the frequency of malnutrition identified by BMI was lower than that detected using AC, TSF, and AMC. This result reinforces that, although BMI is the most frequently used method to "assess" nutritional status, it does not adequately reflect body composition. The Brazilian Society of Oncology Nutrition [5] has emphasized that nutritional diagnosis based solely on BMI may not provide an accurate picture of nutritional status and that other anthropometric measures, such as AC, TSF, and AMC, are easy to apply in clinical practice and contribute to a more precise assessment of body composition.

This study has several limitations to be acknowledged. First, this was a cross-sectional, single-center study with a limited sample size, which precludes causal inference. Recruitment was also restricted by the number of hospital readmissions and the clinical condition of some patients, limiting the number of eligible participants. In addition, muscle mass was assessed using anthropometric measures rather than more precise methods such as CT, DEXA, or BIA. Finally, chemotherapy treatment duration was not evaluated, which may have influenced the interpretations.

CONCLUSION

Patients with hematologic neoplasms showed a high frequency of malnutrition according to AC and TSF, as well as reduced muscle mass and muscle strength. The presence of sarcopenia and low QoL were also important findings in this sample, with an association at the threshold of statistical significance. Further longitudinal studies with larger and more representative samples are needed to draw more robust conclusions about the role of sarcopenia in the QoL of patients with hematologic neoplasms.

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Contributors

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