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NUTRITIONAL RISK IN HOSPITALIZED OLDER ADULTS WITH NEOPLASMS

V. Braga[1], J.L. Braga de Aquino[2], V.A. Leandro-Merhi[3]

Abstract: *Objective:* To investigate nutritional risk in hospitalized older adults with neoplasms. *Methods:* This cross-sectional study collected the following data from 142 older patients: gender, age, length of hospital stay (LHS), death outcome, and nutritional status indicators, such as body mass index (BMI), nutritional risk screening (NRS), subjective global assessment (SGA), and energy intake. The statistical analyses included the tests chi-square, Fisher's exact, and Mann-Whitney's at a significance level of 5%. *Results:* According to the NRS, 42.25% of the patients were at nutritional risk, and according to the SGA, 40.14% of the patients were malnourished. A total of 6.34% of the patients died. Death outcome was significantly associated with gender (p=0.0408); SGA (p=0.0301); NRS (p=0.0360); and LHS (p=0.0043). Nutritional risk (NRS) was significantly associated with SGA and BMI (p<0.0001), and LHS (p=0.0199). *Conclusion:* Death outcome was more common in malnourished patients, patients at nutritional risk, and patients with longer LHS. Nutritional risk was associated with malnutrition (SGA), BMI, and longer LHS. Hence, early nutritional care should be provided routinely in the hospital care of hospitalized older patients.

Key words: Nutritional risk, hospitalized older adults, neoplasms, energy intake, mortality.

Introduction

The population of older adults has risen nearly globally (1). As longevity increases, so do the demands on health providers, society, and health services (1). Some studies have found a higher mortality rate in older adults with cancer undergoing chemotherapy, especially those who are malnourished or at risk of malnutrition (2).

Low energy intake, weight loss, and reduction of body mass index can further increase the frailty and mortality of hospitalized older patients, creating a vicious circle between malnutrition and mortality (1,3). Saka et al, 2011 (4), found that malnourished patients according to the Nutritional Risk Screening (NRS) had longer hospital stays (4). Another study from Albania found that nutritional risk increased progressively in patients aged ≥ 65 years compared with those aged less than 65 years (5).

The literature attests that no single method can determine the nutritional status of hospitalized older adults. Thus, it is necessary to combine methods, using many nutritional risk indicators, such as anthropometry, subjective global assessment (SGA), NRS, and the mini nutritional assessment (MNA), among others, to diagnose an unsatisfactory nutritional status and help this type of patient to make a nutritional recovery (6, 11). Given these considerations, the objective of the present study was to investigate the nutritional risk of hospitalized older adults with neoplasms.

Cases and Methods

This cross-sectional study was conducted from August 2014 to June 2015 after approval of the local Research Ethics Committee. The study population consisted of 142 older adults being treated for neoplasms at the Hospital and Maternity Hospital Celso Pierro, of PUC-Campinas-SP-Brazil.

The following data were collected from the medical records of patients being treated for neoplasms: gender, age, length of hospital stay, and death outcome. The nutritional diagnosis was based on nutritional screening indicators, such as the Nutritional Risk Screening (NSR)11, Subjective Global Assessment (SGA) (7), and body mass index (BMI)10. Habitual energy intake in kcalories was also collected. All these data are routinely recorded in the medical records of the institution. The inclusion criteria were: patients who had undergone nutritional assessment within 24 hours of hospital admission, without end-stage disease, and aged

1. Introduction to Science Grantee, School of Nutrition, PUC-Campinas-SP-Brazil; 2. Professor Doctor, School of Medicine, PUC-Campinas -SP-Brazil; 3. Professor Doctor, School of Nutrition, PUC-Campinas- SP-Brazil.

Corresponding Author: Vânia Ap. Leandro-Merhi, : Pontifical Catholic University of Campinas-SP-Brazil, graduate program in Health Sciences, Puc-Campinas-SP-Brazil, e-mail: valm@dglnet.com.br

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≥ 60 years. The exclusion criteria were: patients with incomplete nutritional status data, patients who did not undergo nutritional assessment shortly after admission, and patients admitted only for clinical investigation and tests.

The BMI of the study population was classified as recommended by Lipschitz (1994)10, who suggests the following cut-off points: underweight when BMI≤22, normal weight when 22<BMI<27, and overweight when BMI≥27.

The NRS, a method developed by Kondrup et al, 200211 classifies the nutritional risk of hospitalized older patients using the following criteria: weight loss, low energy intake, BMI loss, disease severity, and age. Patients are then classified as being or not at nutritional risk according to their score: at risk when score ≥ 3 and not at risk when score < 3)11.

The SGA model established by Detsky et al 7 investigates the following: clinical history, physical examination, weight loss in the last six months, diet changes, presence of significant gastrointestinal symptoms, assessment of functional capacity, and level of disease-related stress. These items allow the nutritional status classification of patients as follows: well-nourished when score < 7 points; mildly malnourished when 7 ≤ score ≤ 17 points; moderately malnourished when 17 < score ≤ 22 points, and severely malnourished when score > 22 points 7.

Later, habitual energy intake (HEI) was assessed by the patient's habitual food intake history, analyzing energy intake. The percentage of HEI adequacy was estimated in relation to the energy requirement (ER) of each patient using the equation proposed by Harris & Benedict12. Energy intake was considered low when the percentage of HEI adequacy was less than 75% of the established daily energy requirement (HEI/ER<75%).

The statistical analysis included a descriptive analysis of the study variables, calculating frequency, percentage, mean, and standard deviation. The chi-square test or Fisher's exact test when necessary was used for checking for associations or comparing proportions. The Mann-Whitney test compared continuous or ordinal measurements between two groups. The significance level was set at 5% for all tests.

Results

This study analyzed the variables gender, age, length of hospital stay, energy intake, death outcome, BMI, NRS, and SGA of 142 older patients with neoplasms. The mean age of the sample was 69.1±7.1 years with a mean LHS of 10.6±9.6 days. The mean percentage of HEI adequacy was 70.8±24.0% (energy intake of 1496±552.4 kcal versus an energy requirement of 2128.4±326.0 kcal). The mean BMI of the sample was 24.4±4.8 kg/m². Most patients were male (75.35%) (Table 1) and 43.66% were normal weight. According to the NRS, 42.25% of the patients were at nutritional risk, and according to the SGA, 40.14% of the patients were malnourished. A few (6.35%) patients died.

Table 1
Characteristics of the study population (N=142)

Variables	Category	N	%
Gender	Female	35	24.65
	Male	107	75.35
Body mass index (kg/m²)	Overweight	37	26.06
	Normal weight	62	43.66
	Underweight	43	30.28
Nutritional Risk Screening	At risk	60	42.25
	No risk	82	57.75
Subjective Global Assessment	Nourished	85	59.86
	Malnourished	57	40.14
Death outcome	Yes	9	6.34
	No	133	93.66

Table 2 compares the study variables and their association with death outcome, which was statistically associated with gender (p=0.0408); SGA (p=0.0301); NRS (p=0.0360); and LHS (p=0.0043). The other study variables, such as BMI, age, and EI, were not associated with death outcome.

Table 3 illustrates the relationship between the study variables and nutritional risk (NRS). NRS was significantly associated with SGA (p<0.0001); with BMI by nutritional status categories (p<0.0001); and with LHS (p=0.0199). Mean BMI along with its standard deviation was also associated with nutritional risk (p<0.0001). The other variables, such as gender, age, EI, ER, and %EI/ER were not associated with nutritional risk (NRS).

Discussion

The main results of this study are that nutritional risk (NRS), malnutrition (SGA), being male, and having longer hospital stays are associated with death outcome in older patients. Furthermore, nutritional risk (NRS) was significantly associated with SGA, longer hospital stays, and lower BMI. Almost one-third (30%) of the sample was underweight, 43% was normal weight, and 26% was overweight. Although most patients were normal weight according to their BMI, 26% were overweight, reflecting the impact of the nutritional transition that still occurs in Brazil (13).

Isenring et al, 2003 (14), reported that 65% of their sample was normal weight, 28% was moderately malnourished, and 7% was severely malnourished according to the SGA. The present study found that 59% of the sample was normal weight and 40% was underweight using the same method. The prevalences of normal weight, moderate malnutrition, and severe

Table 2
Relationship between the study variables and their association with death outcome (N=142)

Variables	Category	Death outcome		P-Value
		Yes	No	
Gender N(%)	Female	5(55.56)	30(22.56)	0.0408[a]
	Male	4(44.44)	103(77.44)	
SGA N(%)	Nourished	2(22.22)	83(62.41)	0.0301[c]
	Malnourished	7(77.78)	50(37.59)	
NRS N(%)	At risk	7(77.78)	53(39.85)	0.0360[c]
	No risk	2(22.22)	80(60.15)	
BMI N(%)	Overweight	1(11.11)	36(27.07)	0.6170[c]
	Normal weight	5(55.56)	57(42.86)	
	Low weight	3(33.33)	40(30.08)	
LHS (X±DP)	Days	22.6±15.4	9.8±8.6	0.0043[b]
Age (X±DP)	Years	71.3±8.9	68.9±7.0	0.5376[b]
EI (X±DP)	Kcal	1289.0±594.8	1512.0±548.7	0.3175[b]
ER (X±DP)	Kcal	2013.3±202.5	2135.3±331.2	0.3118[b]
EI/ER (X±DP)	Percentage	65.5±29.8	71.2±23.7	0.8185[b]
BMI (X±DP)	Kg/m²	24.0±5.0	24.4±4.8	0.4215[b]

a. Chi-square test; b. Mann-Whitney test; c. Fisher's exact test; X±SD: mean and standard deviation; SGA: Subjective Global Assessment; NRS: Nutritional Risk Screening; LHS: Length of hospital stay; EI: Energy intake; ER: Energy requirement; %EI/ER: Percentage of energy intake in relation to the energy requirement; BMI: Body mass index.

Table 3
Relationship between the study variables and their association with nutritional risk according to the Nutritional Risk Screening (NRS) (N=142)

Variables	Category	Nutritional risk		P-value
		At risk	No risk	
Gender N(%)	Female	14(23.33)	21(25.61)	0.7559[a]
	Male	46(76.67)	61(74.39)	
SGA N(%)	Nourished	14(23.33)	71(86.59)	<0.0001[a]
	Malnourished	46(76.67)	11(13.41)	
BMI N(%)	Overweight	6(10.00)	31(37.80)	<0.0001[a]
	Normal weight	19(31.67)	43(52.44)	
	Underweight	35(58.33)	8(9.76)	
LHS (X±DP)	Days	11.5±8.5	9.9±10.3	0.0199[b]
Age (X±DP)	Years	69.6±7.5	68.7±6.9	0.5134[b]
EI (X±DP)	Kcal	1436.9±586.1	1539.0±527.0	0.2867[b]
ER (X±DP)	Kcal	2179.8±370.6	2090.3±285.0	0.2087[b]
EI/ER (X±DP)	Percentage	66.5±25.2	74.0±22.8	0.1202[b]
BMI (X±DP)	Kg/m²	21.6±4.4	26.4±4.0	<0.0001[b]

a. Chi-square test; b. Mann-Whitney test; c. X±SD: mean and standard deviation; SGA: Subjective Global Assessment; NRS: Nutritional Risk Screening; LHS: Length of hospital stay; EI: Energy intake; ER: Energy requirement; %EI/ER: Percentage of energy intake in relation to the energy requirement; BMI: Body mass index.

malnutrition found by another study that used the SGA to assess older cancer patients with a mean age of 70.6±7.8 years were 56.2%, 29.2%, and 14.2%, respectively15. In Chile Pañella et al, 201416, used the SGA to assess 129 patients with a mean age of 60.9±11 years and digestive tract cancer and found that 14.7% were well-nourished, 57.3% were moderately malnourished, and 27.9% were severely malnourished.

A recent study5 assessed 459 patients and found that the risk of malnutrition was higher in patients aged more than 65 years, 82.65% of the deaths involved patients aged 65 years or more, and all patients who died were at nutritional risk (5).

Another study with hospitalized older patients found a mean age of 71.7±8.2 years, mean BMI of 24.5±6.1kg/m2, mean %EI/ER of 71.6±29.9%, and mean LHS of 6.5±6.6 days8 The mean age in the present study was 69.1±7.1 years and mean %EI/ER was 70.8±24%. McLellan et al, 201017, found a mean age of 72.5±8.6 years, while LHS was around 10 days, similar to the LHS found by the present study (LHS = 10.6±9.6 days). In the present study, energy intake was not significantly associated with death outcome or nutritional risk (NRS). In another study McLellan et al, 201018, found that males had higher energy intake than females, and that patients aged 60 years or more had a mean energy intake of 1403.8±563.9 kcal. The mean energy intake found by the present study was 1496±552.4 kcal, very similar to the abovementioned study. Hospitalized older patients have unsatisfactory nutritional status, which may be related to dietary changes (19).

A Mexican study found that 50.2% of the patients were at nutritional risk (NRS) during their hospital stay and that gender, age, weight loss, low food intake, and BMI<20.5kg/m2 had the highest associations with nutritional risk.

The study data evidence that hospitalized older patients may be at nutritional risk. If diagnosed early, reversion of an inadequate nutritional status could reduce long hospitals stays, disease complications, and mortality.

Conclusion

Death outcome was more common in malnourished patients, patients at nutritional risk, and patients with longer hospital stays. Nutritional risk was associated with malnutrition (SGA), BMI, and longer hospital stays. Hence, early nutritional care should be inserted routinely in the hospital care of hospitalized older patients.

Declaration of authorship: All authors collected data, analyzed data, and wrote the article.

Conflicts of interest: The authors have no conflicts of interest.

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