



Beslenme Problemleri Açısından Farkındalık, Tarama ve Takip Nasıl Yapılmalıdır?

Dr.Tülay Kuş

Prevalence of cancer-related MN

Cancer out- and inpatients

- **Cancer outpatients** (1'000 pts, NRS-2002) **33.8 %**

Bozzetti et al. Support Care Cancer 2009;17:279

- **Cancer inpatients** (71 pts, PG-SGA) **76 %**

Bauer et al. Eur J Clin Nutr 2002;56:779

- **Colorectal cancer** (inpatients, 234 pts, PG-SGA) **41 %**

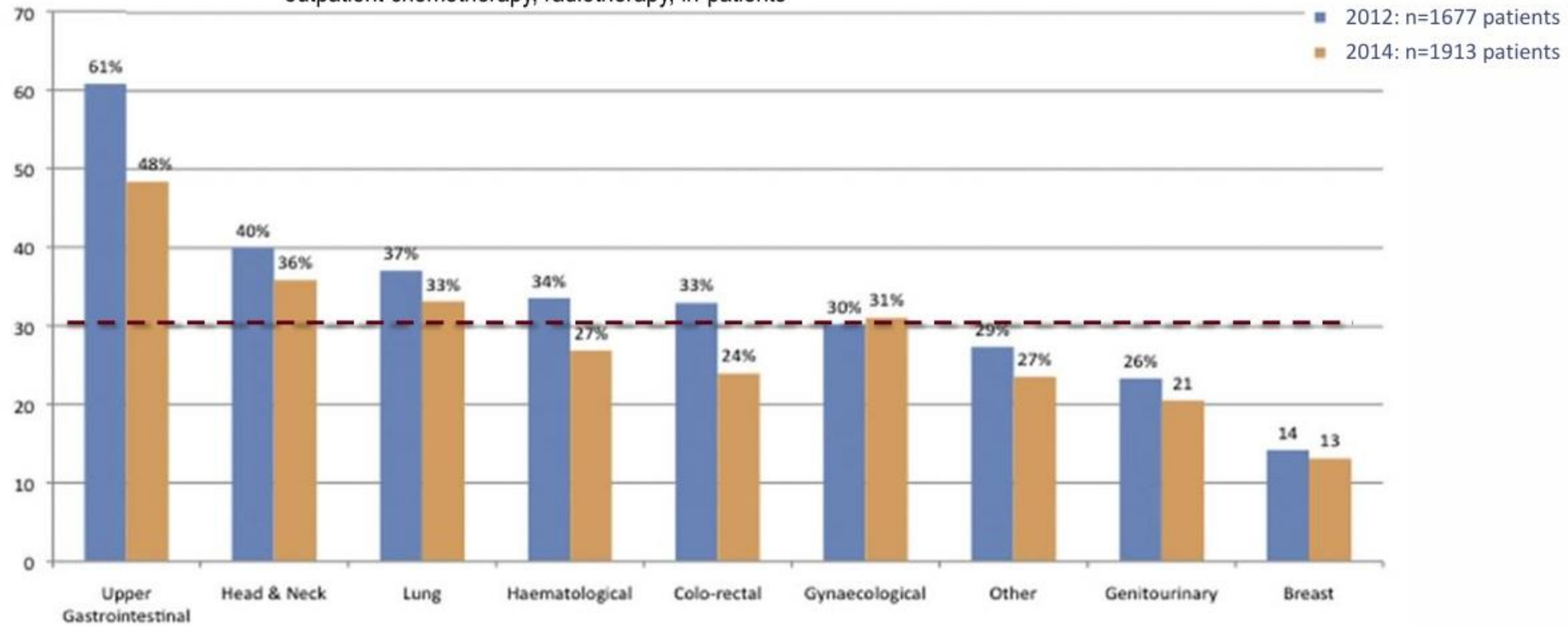
Gubta et al. Eur J Clin Nutr 2004;59:35

- **Ovarian cancer** (inpatients, 132 pts, SGA) **50 %**

Gubta et al. J Ovar Res 2008;1:5

MALNUTRITION: INCIDENCE AND DIAGNOSIS

Point prevalence of malnutrition: Multi-center, Australia, 2012 and 2014
outpatient chemotherapy, radiotherapy, in-patients



Mortality



Length of stay



MALNUTRITION

Increased re hospitalization
Extended convalescence

Morbidity



Increased infection; deteriorated wound healing; diminished
tolerance to anti-cancer therapy; organ dysfunction;
increased complications

Cancer: disease and nutrition are key determinants of patients' quality of life

Paula Ravasco¹, Isabel Monteiro-Grillo, Pedro Marques Vidal, Maria E Camilo

Variable	Global function scores			Global symptom scores ^a			Global single item scores ^a		
	<i>F</i> -test	Estimates of effect size (%) ^b	<i>P</i> value	<i>F</i> -test	Estimates of effect size (%) ^b	<i>P</i> value	<i>F</i> -test	Estimates of effect size (%) ^b	<i>P</i> value
Stage	1.6	1	0.18	56.5	22	0.001	103.7	30	0.0001
Location	111.2	30	0.0001	77.2	41	0.0001	49.2	20	0.001
Energy intake	27.2	10	0.01	1.0	3	0.35	3.9	4	0.07
Protein intake	27.2	10	0.01	1.0	4	0.25	4.2	5	0.07
Weight loss	133.7	30	0.0001	0.05	1	0.82	1.2	3	0.10
Duration of disease	1.5	3	0.14	10.0	7	0.06	1.2	3	0.30
Chemotherapy	35.3	10	0.001	2.1	4	0.22	1.3	1	0.25
Surgery	6.1	6	0.01	1.4	1	0.86	3.0	4	0.09

^a Due to the potential association between symptoms and diagnoses, associations were adjusted for cancer location

^b The sum of percentages may not equal 100% due to the corrected error size

Causes of Cancer-related Malnutrition

- Deterioration in taste, smell and appetite, as a consequence of the disease and/or therapy
- Altered food preferences/avoidance/aversion
- Anorexia
- Dysphagia, odynophagia
- Partial/total gastrointestinal obstruction or dysfunction
- Early satiety, nausea and vomiting
- Soreness, xerostomia, sticky saliva, painful throat, trismus
- Oral lesions and oesophagitis
- Radiotherapy-/chemotherapy-induced mucositis
- Acute or chronic radiation enteritis during and after radiotherapy
- Depression, anxiety
- Pain

High Risk Populationf for Cancer-related Malnutrition

*The topmost cancers associated with weight loss and malnutrition are pancreatic, hepatic, gastric, oesophageal, head and neck and lung cancer; in the case of incurable cancers, all patients are at elevated risk of malnutrition

**Future risks of weight loss; Aggressive treatment, for example, radiotherapy with concurrent chemotherapy, is often associated with acute weight loss of >10%. For radiotherapy, the site of treatment may have important nutritional consequences, for example radiation to the oral cavity, laryngeal, pharyngeal and oesophageal regions: the resulting pain and mucositis impair dietary intake

The early

assessment of nutritional status, including body composition when feasible, is now recommended by international guidelines (European Society for Clinical Nutrition and Metabolism [ESPEN] and European Society for Medical Oncology [ESMO]) on the management of patients with cancer.

Nutritional screening needs to be

**simple*

**rapid*

**easily performed*

on hospital admission or at each oncological visit.

Nutrition in Cancer Care: A Brief, Practical Guide With a Focus on Clinical Practice

Although there is no evidence from randomized clinical trials showing the benefit of ***regular nutritional screening*** in heterogeneous cancer populations, there are some high-risk cancer sites (head and neck, upper GI) where close monitoring (eg, weekly) of the patient's nutritional status is essential.

Other cancer sites where the risk of developing weight loss is lower should be screened on a more individual basis according to the clinical situation, for example, with clinical deterioration because of disease progression and/or toxicities.

From a more practical perspective, every patient with cancer should be screened, at least, at diagnosis of cancer, on hospital admission, on clinical deterioration, and when reporting weight loss while receiving systemic treatment, radiotherapy, or surgery.



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journal homepage: <http://www.elsevier.com/locate/clnu>

ESPEN Guideline

ESPEN practical guideline: Clinical Nutrition in cancer

Maurizio Muscaritoli ^{a,*}, Jann Arends ^b, Patrick Bachmann ^c, Vickie Baracos ^d,

To detect nutritional disturbances at an early stage, we recommend to regularly evaluate nutritional intake, weight change, and body mass index (BMI), beginning with cancer diagnosis and repeated depending on the stability of the clinical situation.

(Recommendation B1-1; strength of recommendation strong e level of evidence very low e strong consensus)



ESPEN Guideline

ESPEN practical guideline: Clinical Nutrition in cancer

Maurizio Muscaritoli ^{a, *}, Jann Arends ^b, Patrick Bachmann ^c, Vickie Baracos ^d,

Nutritional Assessment

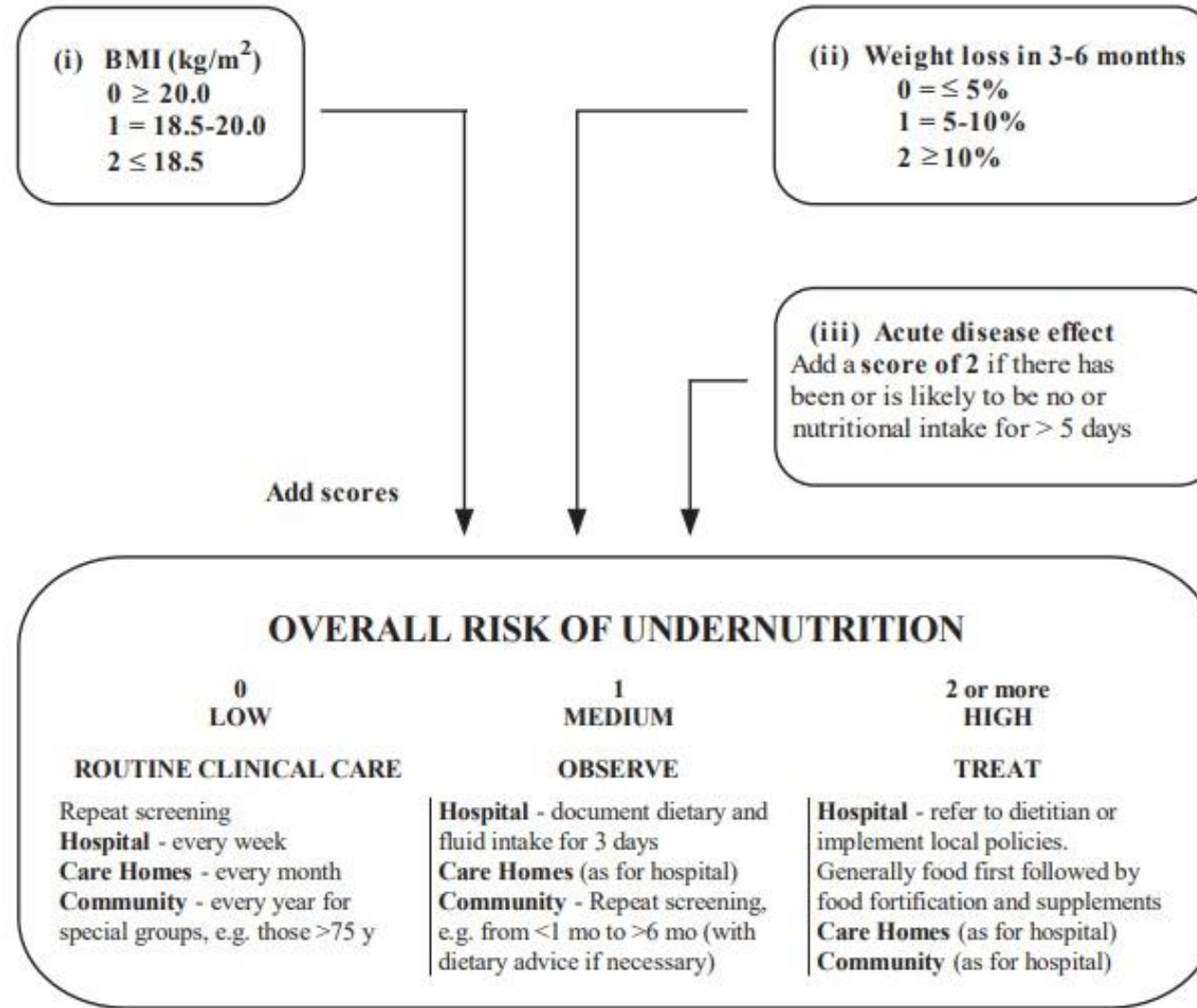
In patients with abnormal screening, we recommend objective and quantitative assessment of nutritional intake, nutrition impact symptoms, muscle mass, physical performance and the degree of systemic inflammation. (Recommendation B1-2; strength of recommendation strong e level of evidence very low e consensus)

Malnutrition screening tools

The severity of food intake impairment may be assessed with validated clinical tools:

1. MUST
2. NRS 2002
3. Mini Nutritional Assessment (MNA)
4. The Patient-Generated Subjective Global Assessment (PG-SGA)

Malnutrition Universal Screening Tool (MUST) for adults



Can be adapted for special circumstances (e.g. when weight and height cannot be measured or when there are fluid disturbances) using specified alternative measurements including subjective criteria. It also identifies obesity ($\text{BMI} > 30 \text{ kg/m}^2$).

Nutritional Risk Screening (NRS 2002)

Table 1 Initial screening			
1	Is BMI <20.5?	Yes	No
2	Has the patient lost weight within the last 3 months?		
3	Has the patient had a reduced dietary intake in the last week?		
4	Is the patient severely ill ? (e.g. in intensive therapy)		
<p>Yes: If the answer is 'Yes' to any question, the screening in Table 2 is performed.</p> <p>No: If the answer is 'No' to all questions, the patient is re-screened at weekly intervals. If the patient e.g. is scheduled for a major operation, a preventive nutritional care plan is considered to avoid the associated risk status.</p>			



Table 2 Final screening			
Impaired nutritional status		Severity of disease (≈ increase in requirements)	
Absent Score 0	Normal nutritional status	Absent Score 0	Normal nutritional requirements
Mild Score 1	Wt loss >5% in 3 mths or Food intake below 50–75% of normal requirement in preceding week	Mild Score 1	Hip fracture* Chronic patients, in particular with acute complications: cirrhosis*, COPD*. <i>Chronic hemodialysis, diabetes, oncology</i>
Moderate Score 2	Wt loss >5% in 2 mths or BMI 18.5 – 20.5 + impaired general condition or Food intake 25–60% of normal requirement in preceding week	Moderate Score 2	Major abdominal surgery* Stroke* <i>Severe pneumonia, hematologic malignancy</i>
Severe Score 3	Wt loss >5% in 1 mth (>15% in 3 mths) or BMI <18.5 + impaired general condition or Food intake 0-25% of normal requirement in preceding week in preceding week.	Severe Score 3	Head injury* Bone marrow transplantation* <i>Intensive care patients (APACHE>10).</i>
Score:	+	Score:	= Total score
Age	if ≥ 70 years: add 1 to total score above = age-adjusted total score		
<p>Score ≥3: the patient is nutritionally at-risk and a nutritional care plan is initiated</p> <p>Score <3: weekly rescreening of the patient. If the patient e.g. is scheduled for a major operation, a preventive nutritional care plan is considered to avoid the associated risk status.</p>			

VALIDATION OF THE MINI NUTRITIONAL ASSESSMENT® SHORT-FORM (MNA-SF)

VALIDATION OF THE MINI NUTRITIONAL ASSESSMENT SHORT-FORM
(MNA®-SF): A PRACTICAL TOOL FOR IDENTIFICATION
OF NUTRITIONAL STATUS

M.J. KAISER¹, J.M. BAUER¹, C. RAMSCH², W. UTER², Y. GUIGOZ³, T. CEDERHOLM⁴, D.R. THOMAS⁵,

Screening	
A Has food intake declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties?	
0 = severe decrease in food intake	
1 = moderate decrease in food intake	
2 = no decrease in food intake	<input type="checkbox"/>
B Weight loss during the last 3 months	
0 = weight loss greater than 3 kg (6.6 lbs)	
1 = does not know	
2 = weight loss between 1 and 3 kg (2.2 and 6.6 lbs)	
3 = no weight loss	<input type="checkbox"/>
C Mobility	
0 = bed or chair bound	
1 = able to get out of bed / chair but does not go out	
2 = goes out	<input type="checkbox"/>
D Has suffered psychological stress or acute disease in the past 3 months?	
0 = yes 2 = no	<input type="checkbox"/>
E Neuropsychological problems	
0 = severe dementia or depression	
1 = mild dementia	
2 = no psychological problems	<input type="checkbox"/>
F1 Body Mass Index (BMI) (weight in kg) / (height in m ²)	
0 = BMI less than 19	
1 = BMI 19 to less than 21	
2 = BMI 21 to less than 23	
3 = BMI 23 or greater	<input type="checkbox"/>

IF BMI IS NOT AVAILABLE, REPLACE QUESTION F1 WITH QUESTION F2. DO NOT ANSWER QUESTION F2 IF QUESTION F1 IS ALREADY COMPLETED.	
F2 Calf circumference (CC) in cm	
0 = CC less than 31	
3 = CC 31 or greater	<input type="checkbox"/>
Screening score (max. 14 points)	<input type="checkbox"/> <input type="checkbox"/>
12-14 points:	Normal nutritional status
8-11 points:	At risk of malnutrition
0-7 points:	Malnourished



Scored Patient-Generated Subjective Global Assessment (PG-SGA)

History: Boxes 1 - 4 are designed to be completed by the patient.
[Boxes 1-4 are referred to as the PG-SGA Short Form (SF)]

1. Weight (See Worksheet 1)

In summary of my current and recent weight:

I currently weigh about _____ kg

I am about _____ cm tall

One month ago I weighed about _____ kg

Six months ago I weighed about _____ kg

During the past two weeks my weight has:

☐ decreased ⁽¹⁾ ☐ not changed ⁽⁰⁾ ☐ increased ⁽⁰⁾

Box 1

☐

3. Symptoms: I have had the following problems that have kept me from eating enough during the past two weeks (check all that apply)

- | | |
|--|---|
| <input type="checkbox"/> no problems eating ⁽⁰⁾ | <input type="checkbox"/> vomiting ⁽³⁾ |
| <input type="checkbox"/> no appetite, just did not feel like eating ⁽³⁾ | <input type="checkbox"/> diarrhea ⁽³⁾ |
| <input type="checkbox"/> nausea ⁽¹⁾ | <input type="checkbox"/> dry mouth ⁽¹⁾ |
| <input type="checkbox"/> constipation ⁽¹⁾ | <input type="checkbox"/> smells bother me ⁽¹⁾ |
| <input type="checkbox"/> mouth sores ⁽²⁾ | <input type="checkbox"/> feel full quickly ⁽¹⁾ |
| <input type="checkbox"/> things taste funny or have no taste ⁽¹⁾ | <input type="checkbox"/> fatigue ⁽¹⁾ |
| <input type="checkbox"/> problems swallowing ⁽²⁾ | |
| <input type="checkbox"/> pain; where? ⁽³⁾ _____ | |
| <input type="checkbox"/> other ⁽¹⁾ ** _____ | |

**Examples: depression, money, or dental problems

Box 3

☐

Patient Identification Information

2. Food intake: As compared to my normal intake, I would rate my food intake during the past month as

- ☐ unchanged ⁽⁰⁾
☐ more than usual ⁽⁰⁾
☐ less than usual ⁽¹⁾

I am now taking

- ☐ normal food but less than normal amount ⁽¹⁾
☐ little solid food ⁽²⁾
☐ only liquids ⁽³⁾
☐ only nutritional supplements ⁽³⁾
☐ very little of anything ⁽⁴⁾
☐ only tube feedings or only nutrition by vein ⁽⁰⁾

Box 2

☐

4. Activities and Function:

Over the past month, I would generally rate my activity as:

- ☐ normal with no limitations ⁽⁰⁾
☐ not my normal self, but able to be up and about with fairly normal activities ⁽¹⁾
☐ not feeling up to most things, but in bed or chair less than half the day ⁽²⁾
☐ able to do little activity and spend most of the day in bed or chair ⁽³⁾
☐ pretty much bed ridden, rarely out of bed ⁽³⁾

Box 4

☐

The remainder of this form is to be completed by your doctor, nurse, dietitian, or therapist. Thank you.

Additive Score of Boxes 1-4

☐

A

Scored Patient-Generated Subjective Global Assessment (PG-SGA)

Worksheet 1 – Scoring Weight Loss

To determine score, use 1-month weight data if available. Use 6-month data only if there is no 1-month weight data. Use points below to score weight change and add one extra point if patient has lost weight during the past 2 weeks. Enter total point score in Box 1 of PG-SGA.

Weight loss in 1 month	Points	Weight loss in 6 months
10% or greater	4	20% or greater
5-9.9%	3	10- 19.9%
3-4.9%	2	6- 9.9%
2-2.9%	1	2- 5.9%
0-1.9%	0	0- 1.9%

Numerical score from Worksheet 1 ☐

Additive Score of Boxes 1-4 (See Side 1) ☐ A

5. Worksheet 2 – Disease and its relation to nutritional requirements:

Score is derived by adding 1 point for each of the following conditions:

- ☐ Cancer ☐ Presence of decubitus, open wound or fistula
☐ AIDS ☐ Presence of trauma
☐ Pulmonary or cardiac cachexia ☐ Age greater than 65
☐ Chronic renal insufficiency
 Other relevant diagnoses (specify) _____

Primary disease staging (circle if known or appropriate) I II III IV Other ☐ B

6. Worksheet 3 – Metabolic Demand

Score for metabolic stress is determined by a number of variables known to increase protein & caloric needs. **Note:** Score fever intensity or duration, whichever is greater. The score is additive so that a patient who has a fever of 38.8 °C (3 points) for < 72 hrs (1 point) and who is on 10 mg of prednisone chronically (2 points) would have an additive score for this section of 5 points.

Stress	none (0)	low (1)	moderate (2)	high (3)
Fever	no fever	> 37.2 and < 38.3	≥ 38.3 and < 38.8	≥ 38.8 °C
Fever duration	no fever	< 72 hours	72 hours	> 72 hours
Corticosteroids	no corticosteroids	low dose (< 10 mg prednisone equivalents/day)	moderate dose (≥ 10 and < 30 mg prednisone equivalents/day)	high dose (≥ 30 mg prednisone equivalents/day)

Numerical score from Worksheet 3 ☐ C

7. Worksheet 4 – Physical Exam

Exam includes a subjective evaluation of 3 aspects of body composition: fat, muscle, & fluid. Since this is subjective, each aspect of the exam is rated for degree. Muscle deficit/loss impacts point score more than fat deficit/loss. Definition of categories: 0 = no abnormality, 1+ = mild, 2+ = moderate, 3+ = severe. Rating in these categories is *not* additive but are used to clinically assess the degree of deficit (or presence of excess fluid).

Muscle Status

temples (temporalis muscle)	0	1+	2+	3+
clavicles (pectoralis & deltoids)	0	1+	2+	3+
shoulders (deltoids)	0	1+	2+	3+
interosseous muscles	0	1+	2+	3+
scapula (latissimus dorsi, trapezius, deltoids)	0	1+	2+	3+
thigh (quadriceps)	0	1+	2+	3+
calf (gastrocnemius)	0	1+	2+	3+
Global muscle status rating	0	1+	2+	3+

Fat Stores

orbital fat pads	0	1+	2+	3+
triceps skin fold	0	1+	2+	3+
fat overlying lower ribs	0	1+	2+	3+
Global fat deficit rating	0	1+	2+	3+
Fluid status				
ankle edema	0	1+	2+	3+
sacral edema	0	1+	2+	3+
ascites	0	1+	2+	3+
Global fluid status rating	0	1+	2+	3+

Point score for the physical exam is determined by the overall subjective rating of the total body deficit. No deficit score = 0 points
Mild deficit score = 1 point
Moderate deficit score = 2 points
Severe deficit score = 3 points
Again, muscle deficit/loss takes precedence over fat loss or fluid excess.

Numerical Score for Worksheet 4 ☐ D

Total PG-SGA Score (Total numerical score of A+B+C+D) ☐

Clinician Signature _____ RD RN PA MD DO Other _____ Date _____

Global PG-SGA Category Rating (Stage A, Stage B or Stage C) ☐

Worksheet 5 – PG-SGA Global Assessment Categories

Category	Stage A Well-nourished	Stage B Moderate/suspected malnutrition	Stage C Severely malnourished
Weight	No weight loss OR recent non-fluid wt gain	≤ 5% loss in 1 month (≤10% in 6 months) OR Progressive weight loss	> 5% loss in 1 month (>10% in 6 months) OR Progressive weight loss
Nutrient intake	No deficit OR Significant recent improvement	Definite decrease in intake	Severe deficit in intake
Nutrition Impact	None	Presence of NIS (Box 3 of PG-SGA)	Presence of NIS (Box 3 of PG-SGA)
Symptoms (NIS)	OR significant recent improvement allowing adequate intake		
Functioning	No deficit OR Significant recent improvement	Moderate functional deficit OR Recent deterioration	Severe functional deficit OR Recent significant deterioration
Physical Exam	No deficit OR chronic deficit but with recent clinical improvement	Evidence of mild to moderate loss of muscle mass &/or muscle tone on palpation &/or loss of SQ fat	Obvious signs of malnutrition (e.g., severe loss muscle, fat, possible edema)

Nutritional Triage Recommendations: Additive score is used to define specific nutritional interventions including patient & family education, symptom management including pharmacologic intervention, and appropriate nutrient intervention (food, nutritional supplements, enteral, or parenteral triage).

First line nutrition intervention includes optimal symptom management.

Triage based on PG-SGA point score

- 0-1** No intervention required at this time. Re-assessment on routine and regular basis during treatment.
2-3 Patient & family education by dietitian, nurse, or other clinician with pharmacologic intervention as indicated by symptom survey (Box 3) and lab values as appropriate.
4-8 Requires intervention by dietitian, in conjunction with nurse or physician as indicated by symptoms (Box 3).
≥ 9 Indicates a critical need for improved symptom management and/or nutrient intervention options.

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According to the results of this meta-analysis, PG-SGA showed the best diagnostic performance among the three modalities with the sensitivity of 0.964, specificity of 0.905.

X. Ruan, R. Nakyeyune, Y. Shao et al.

Clinical Nutrition 40 (2021) 1733–1743

Table 2

Quality of the body of evidence for each outcome of interest reflecting the GRADE) approach.

Outcome	N ^o of studies (N ^o of patients)	Study design	Risk of bias	Indirectness	Inconsistency	Imprecision	Publication bias	Quality of evidence (GRADE)
Construct validity of the MNA	8 studies 1233 patients	cross-sectional studies	serious ^a	serious ^b	serious ^c	not serious	strongly suspected ^d	⊕○○○ VERY LOW
Construct validity of the NRS-2002	28 studies 5160 patients	cross-sectional studies	serious ^a	serious ^b	serious ^c	not serious	strongly suspected ^d	⊕○○○ VERY LOW
Construct validity of the PG-SGA	8 studies 1265 patients	cross-sectional studies	serious ^a	serious ^b	not serious	not serious	strongly suspected ^d	⊕⊕⊕○ MODERATE

^a Found to have a risk of bias when evaluated using the QUADAS-2.

^b The indirectness arises from the differences in populations, reference tests, cut-off values, how and when measurements were taken, as well as training and expertise of the individuals performing and interpreting the tests.

^c The results of the included studies varied widely.

^d Publication bias was assessed by Stata.

Table 3

Result of meta-analysis and Bayes analysis.

	MNA	NRS-2002	PG-SGA
Sensitivity (95% CI)	0.910 (0.763, 0.970)	0.747 (0.680, 0.804)	0.964 (0.913, 0.986)
Specificity (95% CI)	0.720 (0.623, 0.800)	0.854 (0.808, 0.891)	0.905 (0.807, 0.956)
DOR (95% CI)	26.039 (9.732, 69.671)	17.361 (12.922, 23.325)	257.204 (62.758, 1054.108)
LR ⁺ (95% CI)	3.245 (2.464, 4.275)	5.133 (4.029, 6.539)	10.173 (4.775, 21.676)
LR ⁻ (95% CI)	0.124 (0.047, 0.333)	0.296 (0.237, 0.369)	0.039 (0.015, 0.101)
1/LR ⁻ (95% CI)	8.023 (3.000, 21.461)	3.382 (2.713, 4.218)	25.283 (9.874, 64.739)

Abbreviations: MNA mini nutritional assessment, NRS-2002 nutritional risk screening 2002, PG-SGA patient generated subjective global assessment, SGA subjective global assessment; DOR diagnostic odds ratio, LR likelihood ratio, CI confidence interval.

Scored Patient-Generated Subjective Global Assessment (PG-SGA)

Worksheet 1 – Scoring Weight Loss

To determine score, use 1-month weight data if available. Use 6-month data only if there is no 1-month weight data. Use points below to score weight change and add one extra point if patient has lost weight during the past 2 weeks. Enter total point score in Box 1 of PG-SGA.

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10% or greater	4	20% or greater
5-9.9%	3	10- 19.9%
3-4.9%	2	6- 9.9%
2-2.9%	1	2- 5.9%
0-1.9%	0	0- 1.9%

Numerical score from Worksheet 1 ☐

Additive Score of Boxes 1-4 (See Side 1) ☐ A

5. Worksheet 2 – Disease and its relation to nutritional requirements:

Score is derived by adding 1 point for each of the following conditions:

- ☐ Cancer ☐ Presence of decubitus, open wound or fistula
- ☐ AIDS ☐ Presence of trauma
- ☐ Pulmonary or cardiac cachexia ☐ Age greater than 65

☐ Chronic renal insufficiency

Other relevant diagnoses (specify) _____

Primary disease staging (circle if known or appropriate) I II III IV Other ☐ B

Numerical score from Worksheet 2 ☐ B

6. Worksheet 3 – Metabolic Demand

Score for metabolic stress is determined by a number of variables known to increase protein & caloric needs. **Note:** Score fever intensity or duration, whichever is greater. The score is additive so that a patient who has a fever of 38.8 °C (3 points) for < 72 hrs (1 point) and who is on 10 mg of prednisone chronically (2 points) would have an additive score for this section of 4 points.

Stress	none (0)	low (1)	moderate (2)	high (3)
Fever	no fever	> 37.2 and < 38.2	> 38.2 and < 38.8	> 38.8 °C
Fever duration	no fever	< 72 hrs	72-168 hrs	> 168 hrs
Corticosteroids	no cort	< 10 mg prednisone	10-20 mg prednisone	> 20 mg prednisone

Worksheet 3 ☐ C

7. Worksheet 4 – Physical Exam

Exam includes a subjective evaluation of muscle status.

Definition of categories: 0 = no deficit

Muscle Status

temples (temporalis muscle)
clavicles (pectoralis & deltoid)
shoulders (deltoids)
interosseous muscles
scapula (latissimus dorsi, trapezius)
thigh (quadriceps)
calf (gastrocnemius)

Global muscle status rating

Clinician Signature _____

RD RN PA MD DO Other _____

Date _____

Global PG-SGA Category Rating (Stage A, Stage B or Stage C) ☐

Worksheet 4 ☐ D

Sum of A+B+C+D) ☐

Worksheet 5 – PG-SGA Global Assessment Categories

Category	Stage A Well-nourished	Stage B Moderate/suspected malnutrition	Stage C Severely malnourished
Weight	No weight loss OR recent non-fluid wt gain	≤ 5% loss in 1 month (≤10% in 6 months) OR Progressive weight loss	> 5% loss in 1 month (>10% in 6 months) OR Progressive weight loss
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Nutrition Impact	None	Presence of NIS (Box 3 of PG-SGA)	Presence of NIS (Box 3 of PG-SGA)
Symptoms (NIS)	OR significant recent improvement allowing adequate intake		
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Nutritional Triage Recommendations: Additive score is used to define specific nutritional interventions including patient & family education, symptom management including pharmacologic intervention, and appropriate nutrient intervention (food, nutritional supplements, enteral, or parenteral triage).

First line nutrition intervention includes optimal symptom management.

Triage based on PG-SGA point score

- 0-1 No intervention required at this time. Re-assessment on routine and regular basis during treatment.
- 2-3 Patient & family education by dietitian, nurse, or other clinician with pharmacologic intervention as indicated by symptom survey (Box 3) and lab values as appropriate.
- 4-8 Requires intervention by dietitian, in conjunction with nurse or physician as indicated by symptoms (Box 3).
- ≥ 9 Indicates a critical need for improved symptom management and/or nutrient intervention options.

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(PG-SGA) is a specific nutritional assessment and screening tool for oncological patients , but its use as a screening tool is limited by the need for specially trained staff and the length of time needed to carry out the assessment estimated in approximately 15 minutes

NUTRISCORE

A. Have you lost weight involuntarily in the last 3 months?

- No 0
- I am not sure 2

If yes, how much weight (in kilograms) have you lost?

- 1-5 1
- 6-10 2
- 11-15 3
- >15 4
- Unsure 2

B. Have you been eating poorly in the last week because of a decreased appetite?

- No 0
- Yes 1

Location / Neoplasm	Nutritional risk	Score
Head and neck Upper GI tract: oesophagus, gastric, pancreas, intestines Lymphoma that compromised GI tract	High*	+ 2

Lung Abdominal and pelvis: liver, biliary tract, renal, ovaries, endometrial	Medium	+ 1
Breast Central Nervous System Bladder, prostate Colorectal Leukaemia, other lymphomas Others	Low	+ 0
Treatment	YES (+2)	NO (+0)
The patient is receiving concomitant chemo radiotherapy		
The patient is receiving hyper fractionated radiation therapy		
Haematopoietic stem cell transplantation		
	YES (+1)	NO (+0)
The patient is receiving chemotherapy		
The patient is only receiving radiotherapy		
	YES (+0)	NO (+0)
Other treatments or only symptomatic treatment		

**Please repeat the screening every week for those patients at high risk*

Total Score

Score ≥ 5: the patient is at nutritional risk. Please refer to a dietician.

A new nutritional screening tool for oncological outpatients to detect nutritional risk.

Comparative Study

> Nutrition. 2017 Jan;33:297-303. doi: 10.1016/j.nut.2016.07.015.

Epub 2016 Aug 13.

NUTRISCORE: A new nutritional screening tool for oncological outpatients

Lorena Arribas ¹, Laura Hurtós ², Maria José Sendrós ³, Inmaculada Peiró ², Neus Salleras ⁴,
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Affiliations + expand

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Abstract

Objectives: The aim of this study was to design a new nutritional screening tool (NUTRISCORE) to detect nutritional risk in outpatients with cancer.

Methods: A multicenter, cross-sectional study was conducted. We randomly selected outpatients receiving onco-specific, palliative, or symptomatic treatment for malignant neoplasms (including solid tumors and hematologic malignancies). These patients were assessed using the NUTRISCORE tool, the Malnutrition Screening Tool (MST), and the Patient-Generated Subjective Global Assessment (PG-SGA) to detect risk for malnutrition. The new tool included questions regarding the cancer site and active

Using the PG-SGA as a reference method, NUTRISCORE had 97.3% sensitivity and 95.9% specificity.

The so-called Global Leadership Initiative on Malnutrition (GLIM) criteria recommend that patients at nutritional risk, based on a validated screening tool, are assessed for the presence of aetiological and phenotypic criteria (Table 2).

Table 2 GLIM Criteria.

Adapted from: Cederholm T, Jensen GL, Correia MITD, et al; GLIM Core Leadership Committee; GLIM Working Group. GLIM criteria for the diagnosis of malnutrition – a consensus report from the global clinical nutrition community. Clin Nutr 2019; 38:1–9.

Phenotypic criteria	Non-volitional weight loss ¹
	Low BMI ²
	Reduced muscle mass ³
Aetiological criteria	Reduced food intake or assimilation ⁴
	Disease burden/inflammatory condition ⁵

¹ >5% within the past 6 months, or >10% beyond 6 months.

² <20 if <70 years, or <22 if >70 years; Asia: <18.5 if <70 years, or <20 if >70 years.

³ Reduced by validated body composition measuring techniques (i.e. DEXA, BIA, CT, MRI; when not available, physical examination or standard anthropometric measures such as mid-arm muscle or calf circumferences may be used).

⁴ ≤50% of ERs >1 week, or any reduction for >2 weeks, or any chronic GI condition that adversely impacts food assimilation or absorption.

⁵ Acute disease/injury or chronic disease-related (C-reactive protein may be used as a supportive laboratory measure).

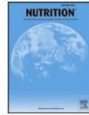
Abbreviations: BIA, bioimpedance analysis; BMI, body mass index; CT, computed tomography; DEXA, dual-energy X-ray absorptiometry; ER, energy requirement; GI, gastrointestinal; GLIM, Global Leadership Initiative on Malnutrition; MRI, magnetic resonance imaging.

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	Disease burden/inflammatory condition ⁵

Patients with at least one aetiological and one phenotypic criterion can be diagnosed with malnutrition



Applied nutritional investigation

Nutritional risk and malnutrition rates at diagnosis of cancer in patients treated in outpatient settings: Early intervention protocol

Elena Álvaro Sanz, Ph.D.^a, Marga Garrido Siles, Pharm.D., Ph.D.^{a*}, Laura Rey Fernández, Dietitian^a

Comparison for nutritional risk

	NO nutritional risk, % (n)	Nutritional risk, % (n)	P-value
Age (y)			
<70	78.4 (174)	21.6 (48)	0.976
≥70	79.5 (58)	20.5 (15)	
Sex			
Male	73 (100)	27 (37)	0.039
Female	83.5 (132)	16.5 (26)	
Grouped tumor location			
Upper gastrointestinal/Head and Neck	37.8 (17)	62.2 (28)	<0.001
All others	86 (215)	14 (35)	
Treatment intention			
Curative/Radical	86.6 (149)	13.4 (23)	<0.001
Palliative	67.5 (83)	32.5 (40)	
Weight loss at diagnosis, % (median)	0 ± 5.4	13.5 ± 7.1	<0.001
GPS			
0	87.8 (115)	12.2 (16)	<0.001
1	74.2 (89)	25.8 (31)	
2	26.7 (4)	73.3 (11)	
INI risk	38.9 (208)	65.5 (58)	<0.001
Cachexia			
Presence of cachexia	50.8 (60)	49.2 (58)	<0.001
Absence of cachexia	97.2 (172)	2.8 (5)	

GPS, Glasgow Prognostic Score; INI, Inflammatory-Nutritional Index

Glasgow Prognostic Score (GPS) for Cancer Outcomes

Provides cancer prognosis based on serum biomarkers.

INSTRUCTIONS

Note: We recommend the [Modified Glasgow Prognostic Score](#) over this original version.

When to Use ▼

Pearls/Pitfalls ▼

Why Use ▼

CRP

CRP ≤10 mg/L

CRP >10 mg/L

Albumin

Albumin <3.5 g/dL (35 g/L)

Albumin ≥3.5 g/dL (35 g/L)

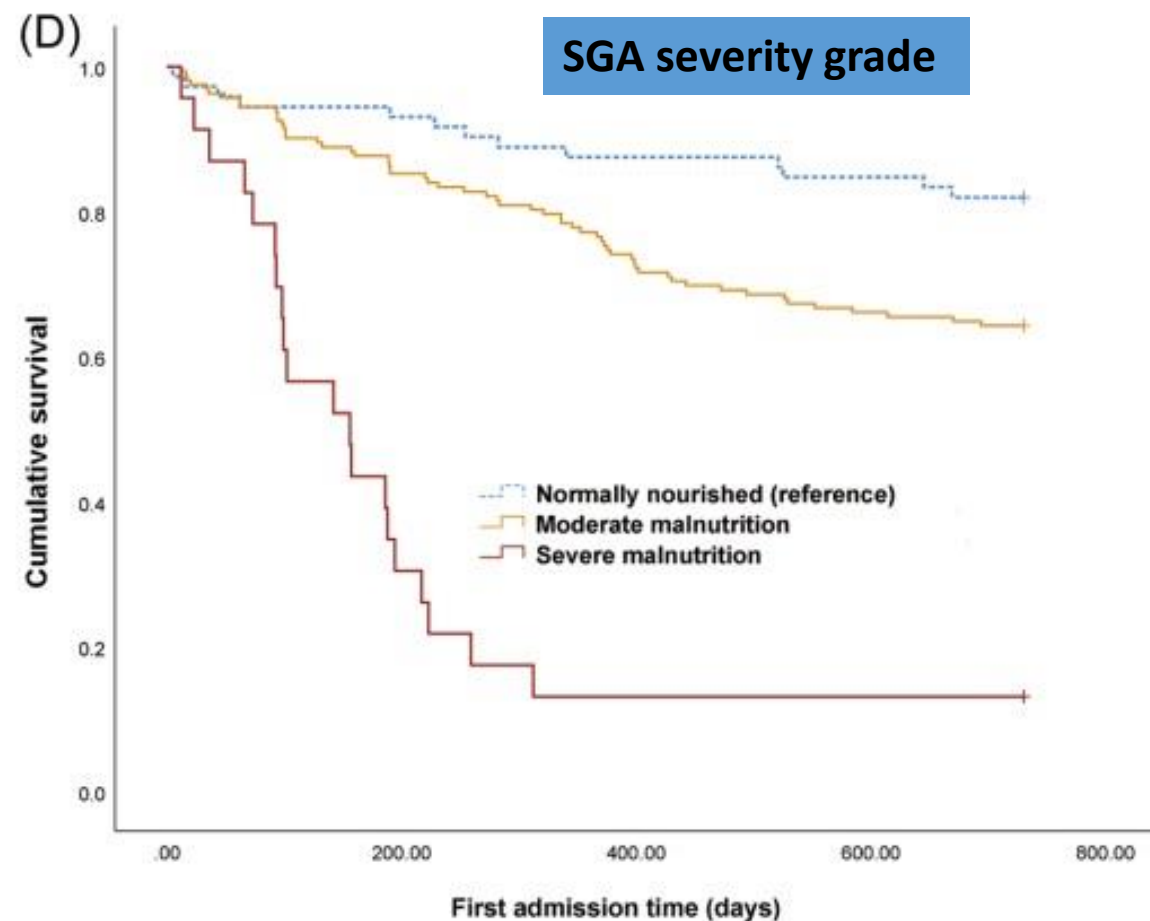
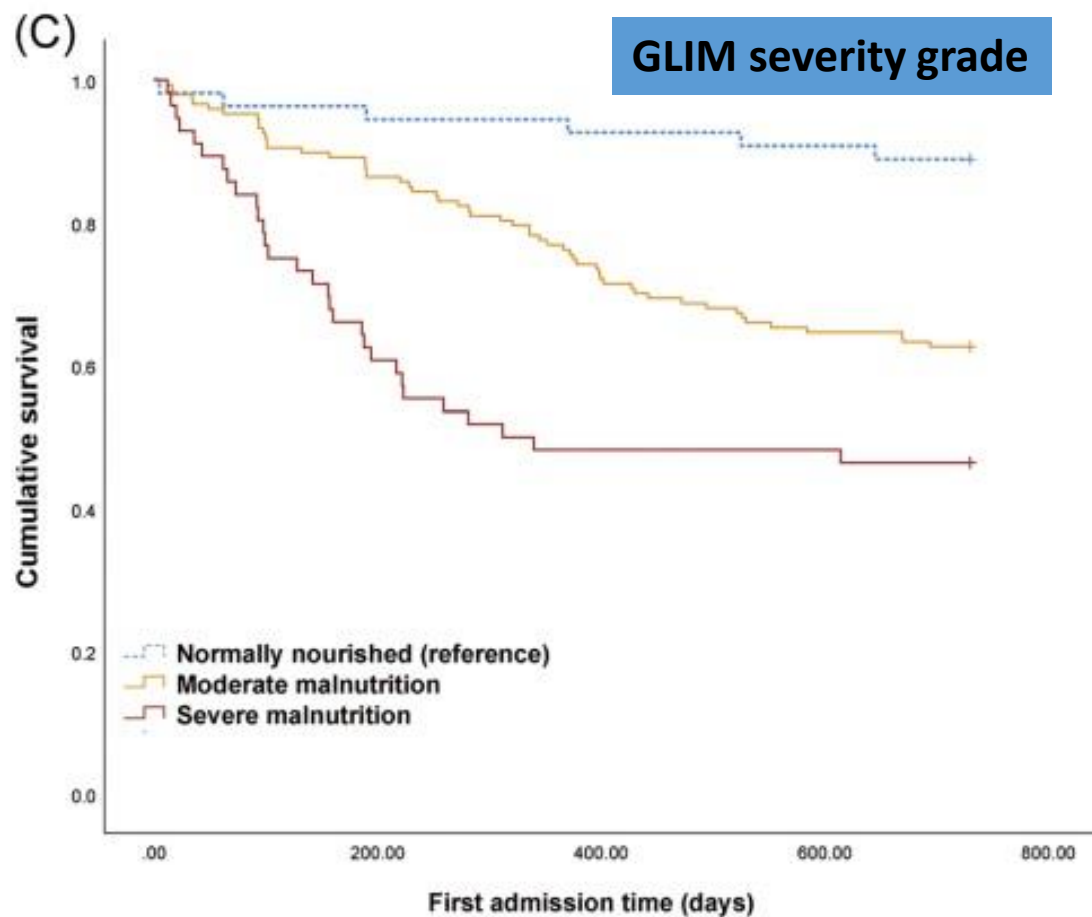
GPS 2

Poor Prognosis

Patients were considered at risk when the Nutriscore was ≥5 points. The PG-SGA was used to evaluate patients' nutritional status

TABLE 3 The univariable and multivariable Cox regression analysis of malnutrition defined by the GLIM criteria and the SGA.

Nutrition assessment	2-year incidence of unplanned hospital admission			
	Univariable analysis		Multivariable analysis	
	HR (95% CI)	P value	HR (95% CI)	P value
Malnutrition according to the GLIM criteria				
No (normally nourished)	Reference	—	Reference	—
Yes (malnutrition)	4.61 (2.01–10.55)	<0.001	2.85 (1.22–6.68)	0.016
Stage 1 (moderate malnutrition)	3.85 (1.66–8.95)	0.002	2.43 (1.02–5.77)	0.045
Stage 2 (severe malnutrition)	7.26 (3.02–17.47)	<0.001	4.32 (1.75–10.66)	0.002
Malnutrition according to the SGA				
No (normally nourished)	Reference	—	Reference	—
Yes (malnutrition)	2.76 (1.53–4.96)	0.001	2.07 (1.13–3.79)	0.019
SGA-B	2.20 (1.21–4.02)	0.010	1.63 (0.88–3.04)	0.122
SGA-C	12.48 (6.11–25.51)	<0.001	8.39 (3.98–17.71)	<0.001



**Kaplan–Meier curves for 2-year unplanned hospital admission stratified by the GLIM severity grade and SGA severity grade.
GLIM, Global Leadership Initiative on Malnutrition; SGA, Subjective Global Assessment.**

Body Composition Assessment

- Bioimpedance analysis (BIA), which derives fat mass and fat-free mass from hydration status using validated formulae, is used routinely.
- Also, the use of other imaging techniques, including dual-energy X-ray absorptiometry (DEXA), MRI and USG of quadriceps muscle, have been proposed but their feasibility and reliability remain questionable at the time of publication.
- The gold standard for the measurement of body composition changes in patients with cancer is the analysis of tissue density using a **computed tomography scan** at the level of the 3. lumbar vertebra.

OS, defined as the time between PD and death. Patients were observed until death or 1 September 2015, at which time they were censored. Survival data was obtained from

To determine skeletal muscle mass at the L3 level, the cross-sectional skeletal muscle surface (cm^2) was identified and quantified by HU thresholds of -29 to $+150$.^{1,3,7}

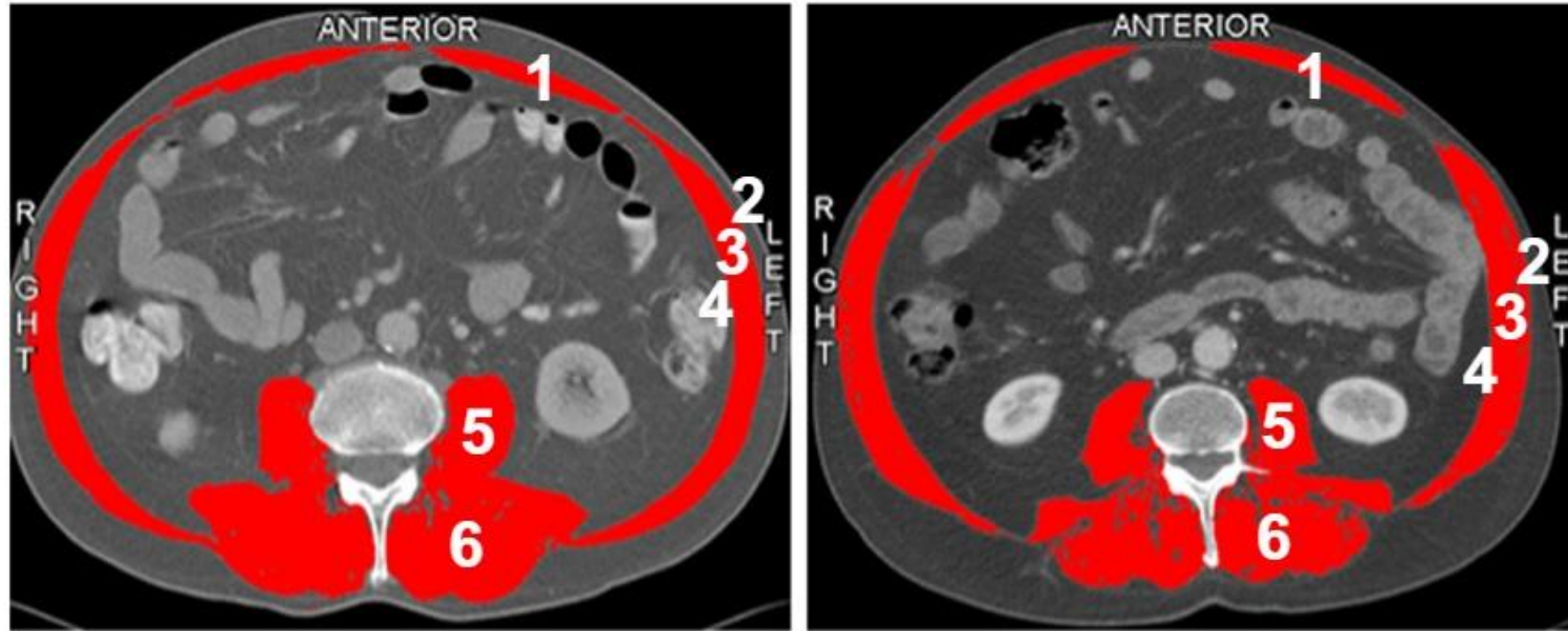


FIG. 1 Computed tomography scans at the third lumbar vertebrae level of two male patients. *Right* Patient with a low skeletal muscle index (SMI, 56.8) (muscle mass) but a normal muscle attenuation index (MAI, 49.8) (muscle quality). *Right* Patient with a normal SMI

and a low MAI (MAI, 24.0). The skeletal muscle area is highlighted in *red*. 1 rectus abdominis, 2 external oblique, 3 internal oblique, 4 transverse abdominal, 5 psoas, 6 paraspinal

Original article

Sarcopenia and mortality in cancer: A meta-analysis

Philip Chun-Ming Au ^{a,1}, Hang-Long Li ^{d,1}, Grace Koon-Yee Lee ^{a,1}, Gloria Hoi-Yee Li ^a

Pooled hazard ratios of low lean mass on mortality according to cancer type.

Cancer type	Number of studies	Overall (HR [95% CI]), I ²
Bile duct (excludes intrahepatic)	2	2.58 [1.82, 3.64], 0%
Breast	3	1.69 [0.79, 3.58]; 61%
Gastrointestinal	18	1.56 [1.36, 1.78]; 48%
Head and neck	1	1.92 [1.19, 3.11]; NA
Hematopoietic	3	1.34 [0.51, 3.53]; 73%
Liver and intrahepatic bile duct	17	2.22 [1.86, 2.65]; 24% ^a
Lung	5	2.19 [1.28, 3.75]; 60%
Ovarian and endometrium	6	1.24 [0.91, 1.70]; 49% ^b
Pancreatic	8	1.63 [1.44, 1.84]; 0%
Prostate	1	0.90 [0.54, 1.50]; NA
Urinary tract	12	1.88 [1.52, 2.34]; 41%
Mixed	5	1.19 [1.03, 1.38]; 61%
Overall	81	1.68 [1.55, 1.83]; 63%

HR, hazard ratio; CI, confidence interval; NA, not applicable.

^a Higashi 2016 performed subgroup analysis, hepatocellular carcinoma subgroup was chosen (appendix p27, ref 58).^b Rutten 2017 included both lean mass measurements, L3 Skeletal Muscle Index

Results: Altogether 100 studies evaluated the association between lean mass and cancer mortality. The overall pooled HR on cancer mortality was 1.41 (95% CI, 1.24 to 1.59) for every standard deviation decrease in lean mass and 1.69 (95% CI, 1.56 to 1.83) for patients with sarcopenia (binary cutoffs). Overall mortality was also significantly associated with sarcopenia in across various cancer types, except for hematopoietic, breast, ovarian and endometrial, and prostate cancer.

The key is to regularly measure changes in body compartments



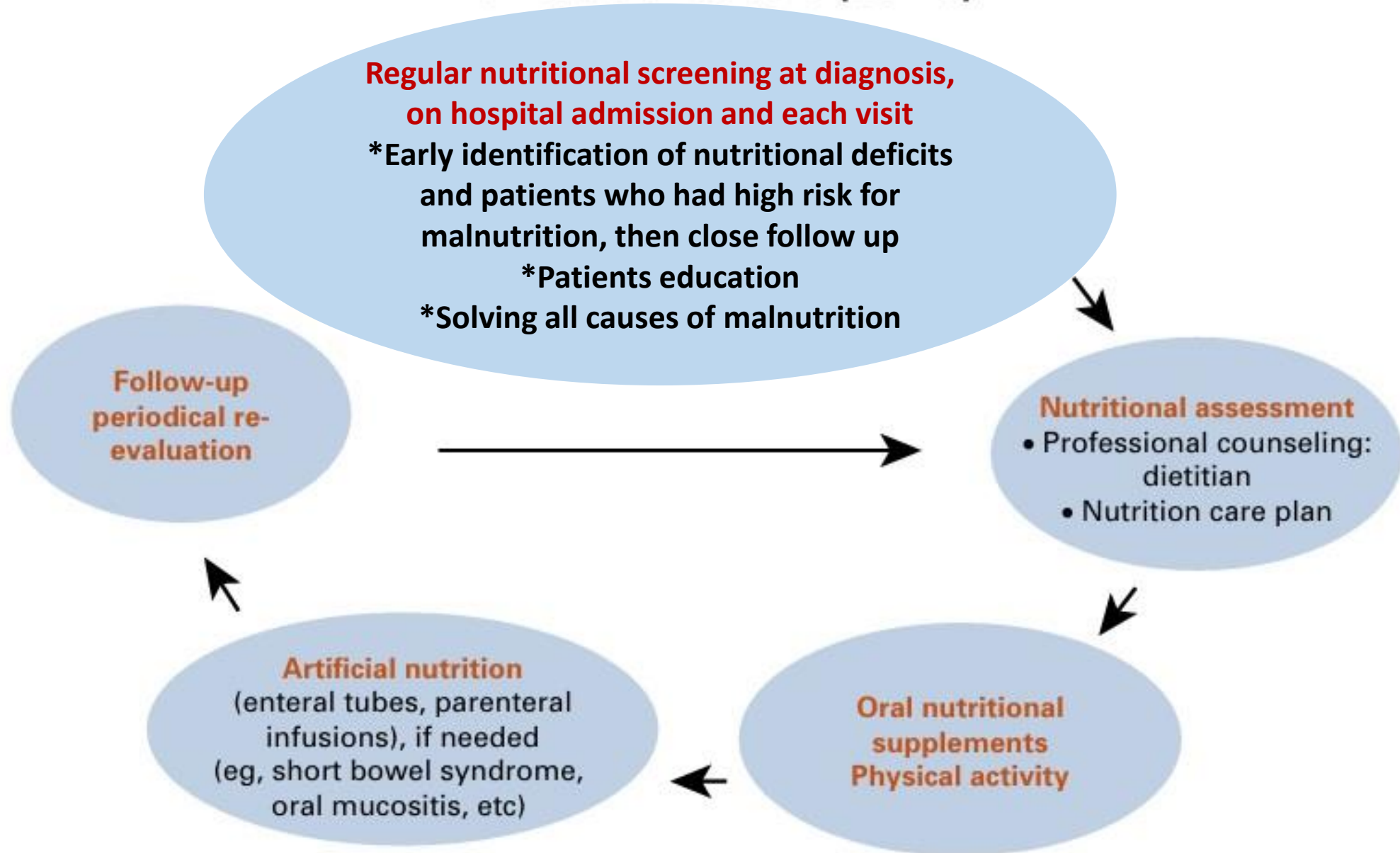
Exact measurement of body compartments is difficult

The key is to regularly measure changes in body compartments



Patients should be empowered
and responsible for monitoring their body weight (BW)
every 2-3 weeks, and immediately report non-volitional
weight loss $>5\%$ of their usual BW. It is also
advisable that changes in their functional ability be
reported even in the absence of significant weight loss

The metabolic-nutritional pathway



Teşekkürler...