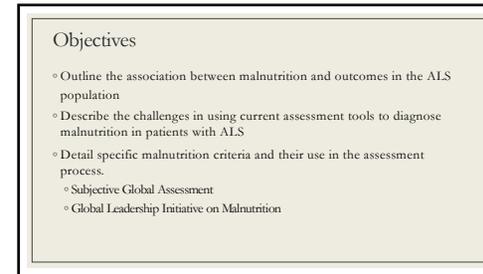
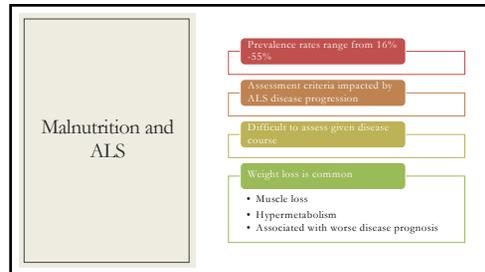


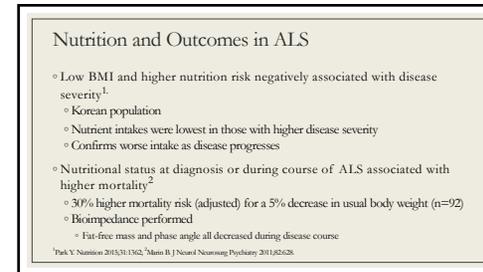
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4

Subjective Global Assessment

- Developed in the late 1980's, a significant variation on the prevailing nutrition assessment methodology

What is Subjective Global Assessment of Nutritional Status?

ALLAN S. DITKOV, M.D., Ph.D., JOHN R. McLAGORDIN, M.Sc., JEFFREY P. BAKER, M.D., NANCY JOHNSTON, B.Sc.N., SCOTT WHITAKER, M.D., DENA A. MENDELSON, Sc.D., AND KENNEDY N. JERREBOY, M.B.B.S.

From the Department of Health Administration and Medicine, University of Toronto, the Department of Nutrition, Ryerson Polytechnical Institute, the Division of General Internal Medicine and Clinical Epidemiology and Gastroenterology, Toronto General Hospital, and the Division of Gastroenterology, Toronto Western Hospital, and St. Michael's Hospital, Toronto, Canada

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Domains of SGA

- Nutrient Intake**
 - Adequate: No change
 - Inadequate: suboptimal solids, full fluids or minimal intake
- Weight Loss**
 - <5% between 5% and 10% or >10%
 - Weight loss in the last two weeks
- Symptoms**
 - Pain, anorexia, nausea, vomiting, diarrhea
 - Dental issues, dysphagia, early satiety

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Domains of SGA – Relevant for ALS

- Nutrient Intake**
 - Adequate: No change
 - Inadequate: suboptimal solids, full fluids or minimal intake
- Weight Loss**
 - <5% between 5% and 10% or >10%
 - Weight loss in the last two weeks
- Symptoms**
 - Pain, anorexia, nausea, vomiting, diarrhea
 - Dental issues, dysphagia, early satiety

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Domains of SGA – Relevant for ALS

- Function**
 - No dysfunction
 - Reduced capacity: difficulty with activities of daily living chair or bed-bound
- Metabolic**
 - High metabolic requirement
 - Yes or No
- Physical Appearance**
 - Loss of body fat and muscle
 - Presence of edema

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SGA Rating

- Well nourished
- Normal

SGA: A

- Mildly to moderately malnourished

SGA: B

- Severely malnourished

SGA: C

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GLIM: Malnutrition Diagnostic Approach

The image shows a screenshot of the GLIM Malnutrition Diagnostic Approach flowchart and the corresponding criteria document. The flowchart outlines the steps for diagnosing malnutrition, starting with a clinical nutrition assessment and leading to a diagnosis based on the GLIM criteria. The criteria document lists the specific criteria for malnutrition, including weight loss, low BMI, muscle mass, food intake, and inflammation.

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GLIM Criteria Selection

Table 1. Survey of Existing Approaches Used in Screening and Assessment of Malnutrition and Cachexia.

	NRA 2002 ¹¹	MNA 2002 ¹²	MUST ^{13,14}	ASPEN 2012 ¹⁵	AND ¹⁶	SGA ¹⁷	Exams 2008 ¹⁸	PEW 2008 ¹⁹	Pratin 2011 ²⁰
Exhaustive									
Reduced food intake	X	X	X	X	X	X	X	X	X
Physical loss	X	X	X	X	X	X	X	X	X
Weight loss	X	X	X	X	X	X	X	X	X
Body mass index	X	X	X	X	X	X	X	X	X
Label of low muscle/mass	X	X	X	X	X	X	X	X	X
Weight	X	X	X	X	X	X	X	X	X
Fluids									
Muscle loss/weakness									
Food strength									
Medication							X	X	

AND, Academy of Nutrition and Dietetics; ASPEN, American Society of Parenteral and Enteral Nutrition; EFEN, European Society for Clinical Nutrition and Metabolism; MNA, Mini Nutritional Assessment; MUST, Malnutrition Universal Screening Tool; NRS-2002, Nutrition Risk Screening 2002; PEW, protein-energy wasting; SGA, subjective global assessment.

¹¹Adapted for older adults.
¹²Original version.
¹³Adapted for chronic kidney disease.

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GLIM Malnutrition Diagnosis

Phenotypic Criteria	
Weight Loss (%)	>5% within past 6 months >10% beyond 6 months
Body Mass Index	<20 if > 70 years <20 if ≤ 70 years
Muscle Mass	Reduced

Etiologic Criteria	
Food Intake or Assimilation	Ingestion <=50% ER Any reduction for ≥ 2 weeks Any chronic GI condition that adversely impacts food assimilation or absorption
Inflammation	Presence of acute disease/injury or chronic disease related

Malnutrition: One criterion from each category

BMI: Worldwide
 < 20 kg/m² if < 70 years
 < 22 kg/m² if ≥ 70 years

BMI: Asian
 < 18.5 kg/m² if < 70 years
 < 20 kg/m² if ≥ 70 years

GLIM, Global Leadership Initiative on Malnutrition; ER, energy requirement.

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GLIM Malnutrition Diagnosis

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Reference: Compher C. 2014. 65(1):14-49. doi:10.1002/lsm.1242

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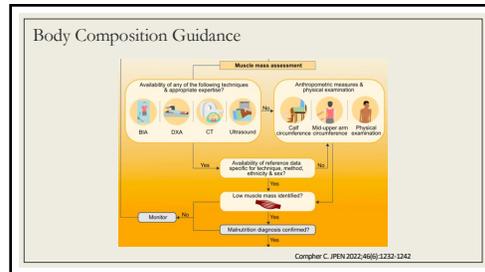
Malnutrition Severity

4 Determine Malnutrition Severity

Severity Grade	Phenotypic Criteria		
	Non-volitional Weight Loss (%)	Low BMI (kg/m ²) ^a	Reduced Muscle Mass
Stage 1: Moderate Malnutrition Patient requires 1 phenotypic criterion that meets this grade.	<ul style="list-style-type: none"> • 5-10% in 6 months; or • 10-20% in more than 6 months 	<ul style="list-style-type: none"> • <20 if <70 years; or • <22 if ≥70 years 	<ul style="list-style-type: none"> • Mild-to-moderate deficit (per validated assessment methods on previous page)
Stage 2: Severe Malnutrition Patient requires 1 phenotypic criterion that meets this grade.	<ul style="list-style-type: none"> • >10% in 6 months; or • >20% in more than 6 months 	<ul style="list-style-type: none"> • 18.5 if <70 years; or • <20 if ≥70 years 	<ul style="list-style-type: none"> • Severe deficit (per validated assessment methods on previous page)

Reference: Compher C. 2014. 65(1):14-49. doi:10.1002/lsm.1242

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Reduced Food Intake or Assimilation

Consider GI symptoms that impact food intake or absorption

- **Dysphagia**, nausea, vomiting, diarrhea, constipation or abdominal pain

Presence of malabsorptive disorders

- Intestinal failure (SBS)
- Pancreatic insufficiency
- Post operative bariatric surgery

Other clinical situations

- Esophageal strictures, gastroparesis, enterocutaneous fistula and intestinal pseudo-obstruction

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GLIM Implementation Survey - 2022

Collect global information regarding implementation of the GLIM diagnostic construct in patient care and research.

Identification of enablers and barriers to implementation of the GLIM diagnostic construct.

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GLIM Survey – Global Reach

- Respondents from 82 countries
- Countries with >90 respondents
- Brazil (n=190)
- Germany (n=98)
- The United States (n=384)

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GLIM Implementation

Have the GLIM criteria been implemented in your practice?

Answer Choices	Responses	Count
Yes	26.51%	222
No	55.18%	480
In process	20.14%	177
Answered		879
Skipped		653

- Used alongside other comprehensive assessment instruments?
 - 363 responded
 - 75% - yes
 - 25% - no
- Existing instruments (n=252)
 - Subjective Global Assessment – 38%
 - Academy/ASPEN – 31%
 - Mini-Nutritional Assessment – 30%
 - Other – 33%

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GLIM Criteria Utilization

Criterion	Responses	Percentage*
Non-volitional weight loss	317	96%
Reduced food intake or assimilation	307	93%
Low body mass index	270	82%
Inflammation	219	66%
Reduced muscle mass	209	63%

*Of those who answered this question
 **331 respondents answered this question (21.8%)

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Assessment Method for Criteria

	Weight Loss (n=333)	Low BMI (n=330)	Reduced Muscle Mass (n=327)	Reduced food intake or anorexia (n=330)	Inflammation (n=330)
Health record	62.3%	58.2%	14.7%	48.8%	59.4%
Patient interview	83.7%	55.2%	50.6%	92.4%	17%
Objective measurement	69.8%	75.9%	46.5%	35.3%	41.8%
Physical examination	44.1%	37.6%	64.8%	14.2%	23.6%
Not utilized	0.3%	2.4%	18.7%	1.2%	16.4%

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GLIM Application – Mr. C

- 67 yrs, admitted with rectal bleeding, weight loss and anemia
- Past medical history
 - Hypertension
 - Pre-diabetes
 - Ventral hernia repair – 5 years ago
- Colonoscopy
 - Near obstructing mass in the sigmoid colon – preliminary diagnosis of adenocarcinoma of the colon.

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GLIM Application – Mr. C

- Nutrition screening
 - Malnutrition screening tool (MST)
 - Score of 3 – nutrition risk
- Nutrition assessment
 - Height: 71" (180 cm)
 - Weight 6 months ago: 179# (81.4kg)
 - Current weight: 160# (72.7kg)
 - BMI: 22.3
 - Weight loss: 10.6% in past 6 months
 - Food intake
 - Gradually has decreased over last few months
 - Now eating less than half of normal meals

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GLIM Application – Mr. C

- Nutrition focused physical exam
 - Moderate loss of muscle
 - Temporalis
 - Clavicular
 - Deltoid
 - Psoas
 - Gastrocnemius
 - Clinical parameters
 - Albumin – 3.2 mg/dl
 - Pre-albumin – 12 mg/dl
 - C-reactive protein – 10 mg/dl

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And now....on to the journal review

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Original article
 Malnutrition at diagnosis in amyotrophic lateral sclerosis (als) and its influence on survival; Using glim criteria

Juan José López-Gómez ^{1,2,*}, María D. Ballesteros-Pomar ^{3,4}, Beatriz Torres-Torres ^{5,6},
 Begoña Píñor De la Maza ⁷, M. Angeles Penacho-Lázaro ⁸, José M. Palacio-Muñoz ⁹,
 Cristina Abreu-Pedín ¹, Antonio López-García ¹, Daniel A. De Luis-Roman ¹⁰

- Introduction
 - Description of ALS
 - Majority of patients develop malnutrition
 - Malnutrition at diagnosis or during disease course related to survival
- Aims of study
 - To assess the nutrition status at nutrition support initiation in the patient with ALS
 - Evaluate the influence of initial nutrition status on disease evolution and survival

Lopez-Gomez JJ. Clin Nutr 2021;40:237-244.

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Study Methods

- Observational cohort study
- All patients with an ALS diagnosis referred to clinics in 7 hospital in Spain
- Informed consent
- Research committee approval
- Planned data analysis
 - Nutrition status prevalence
- Univariate and multivariate analysis
 - Evolution of the disease
 - The effect of nutrition support on outcome

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Variables Assessed

- Disease characteristics
- Anthropometry
 - Weight, height, BMI
 - Percentage of weight loss
- Nutrition assessment
 - SGA
 - GLIM
 - Muscle mass assessment not completed in all patients
- Body composition
 - Bioelectrical impedance

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Results

- Total patients – 98
- Hospital varied from 1 to 42 patients
- ALS confirmed – 93 patients (other 5 were excluded)
 - 52.7% - spinal onset
 - 47.3% - bulbar onset
- Anthropometrics
 - BMI: 24.4 (21.7-25.9)
 - Weight loss: 9.3% (2.7-17.6)
 - Time period: 9 months (6-12)

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Results

- Nutrition status
 - SGA
 - A=27; B=43; C=23
 - GLIM
 - Moderate=15
 - Severe=30
 - Agreement – Kappa: 0.27 (<0.01) – minimal agreement
 - Spinal – Kappa: 0.3 (p<0.01)
 - Bulbar – Kappa: 0.24 (p<0.01)
- Body composition
 - n=31
 - FMI = 18.8 kg/m² (men); 15.8 kg/m² (women)-p<0,05
 - Met GLIM criteria: n=5

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Results

- Relationship between survival and nutrition status
 - Higher nutrition status (SGA) = longer survival time (Kaplan-Meier curve): (p=0.03)
 - Decreased survival with severe malnutrition (GLIM): 18 months vs 20 months (p=0.01)
- Multivariate analysis
 - Risk for mortality (SGA): HR: 4.6 (1.5-13.0; p=0.007) over 15 months
 - Risk of mortality (GLIM-severe): HR 1.73 (0.7-4.4) p=0.25) over 15 months
 - Adjusted for age, sex and type of onset of ALS

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Discussion

- Nutritional deterioration seen at first visit – associated with negative influence on survival
- Not observed equally between SGA and GLIM (unless severe)
- Overall lower malnutrition prevalence with GLIM vs SGA (Figure 2)
 - Much less moderate malnutrition with GLIM
 - Fairly equal with severe (except with bulbar form)
 - If BIA or another form of muscle assessment performed, likely a higher malnutrition prevalence with GLIM
- Limitation
 - Lack of muscle assessment
 - Lack of criteria observed for GLIM malnutrition

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Conclusion

- Patients with ALS are often malnourished at diagnosis
 - Moderate to severe weight loss
- Those with better nutrition status (SGA) at diagnosis have a longer survival time.
 - Severe malnutrition (GLIM) had a lower survival
- Malnutrition as measured by SGA (mod or severe) is an independent risk factor for mortality

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THANK YOU!!!

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