

## **European Academy for Medicine of Ageing Session Participants' Report on Malnutrition Assessment and Diagnostic Methods; an International Survey**

### **Abstract (250 max)**

**Introduction:** Malnutrition and nutrition-related diseases are associated with hospital admissions, disability, institutionalization, and mortality in older people. Specialists in Geriatric Medicine and nutrition evaluate nutritional status as part of the comprehensive geriatric assessment; however, malnutrition still remains under-recognized and under-managed. Our survey explored nutrition assessment approaches used in daily clinical practice by geriatricians across Europe.

**Methods:** A 19-item survey on methods and instruments for malnutrition assessment in geriatric settings, and details of any national guidelines, was sent to 40 postgraduate fellows of the European Academy of Medicine of Ageing (EAMA, 2017-2019 class).

**Results:** Thirty-six of the 40 eligible EAMA participants, representing 14 European countries, responded. In clinical practice, MNA and MNA-SF were most frequently used for screening (44.1%, 52.9%, respectively) and diagnosing (45.7%, 40.0%) malnutrition. Weight loss (n=36, 100%), body mass index (n=30, 85.7%), and low energy/food intake (n=27, 77.1%) were the most frequent clinical variables considered. The absolute and relative amount of weight loss, and over what time period, varied widely. These routinely considered clinical factors contribute to validated GLIM, ASPEN-AND and ESPEN criteria for diagnosis of malnutrition, but these criteria were seldom used (GLIM=0%, ASPEN=0%; n=9, ESPEN=25.7%). National guidelines were available in 9 of the 14 countries, and generally recommended MNA and MNA-SF for community-dwelling and hospitalized older patients. Albumin was often suggested as a nutritional marker.

**Conclusions:** Nutritional assessment is systematically performed in geriatrics; but differs widely among geriatricians and countries. Harmonizing guidelines with the new international consensus might provide best-evidence care for older people across Europe.

## **Highlights**

Nutritional assessment performed by geriatricians in clinical practice varies widely across European countries.

The clinical criterion most widely used is weight loss; however, percentage weight-loss and time-frame should be evaluated to determine if re-evaluation is needed

Clinical assessment of malnutrition was based on the items that constitute the sub-scores of the GLIM, ESPEN, and ASPEN/AND criteria, without using the three validated definitions

Harmonizing the national guidelines on malnutrition assessment with GLIM criteria and ESPEN consensus might provide best-evidence care for older people across Europe.

## **Abbreviations**

AND: Academy of Nutrition and Dietetics

ASPEN: American Society of Parenteral and Enteral Nutrition

BMI: Body mass index

CGA: Comprehensive Geriatric Assessment

ESPEN: European Society for Clinical Nutrition and Metabolism

FFMI: Fat-free mass index

GMS: Graz Malnutrition Screening

GLIM: Global Leadership Initiative on Malnutrition

ICD: International Classification of Diseases

MNA: Mini-Nutritional Assessment

MNA-SF: Mini-Nutritional Assessment Short Form

MUST: Malnutrition Universal Screening tool

NRS: Nutritional Risk Screening Tool

## INTRODUCTION

Malnutrition, a prevalent condition in older adults, is associated with clinical adverse outcomes (1), increased disability (2)(3), morbidity (4)(5), mortality (6)(7), and use of health resources (8)(9)(10)(11). The early identification of malnourished inpatients may help the multidisciplinary care team to set realistic goals, plan therapeutic strategies, and provide the patients and caregivers with more precise information (12).

Specialists in Geriatric Medicine have long evaluated nutritional status as part of the Comprehensive Geriatric Assessment (CGA) (13); however, malnutrition still often remains unrecognized and undermanaged (14)(15), probably due to a lack of a best-practice approach. Establishing an international standard requires sufficient evidence to recommend a particular nutrition assessment tool (16) and clear and consensual guidelines appropriate for older people in all settings (17).

The Global Leadership Initiative on Malnutrition (GLIM) criteria were launched in September 2018; to be used in adults worldwide for malnutrition diagnosis. It incorporates the most up-to-date criteria, based upon the European Society of Clinical Nutrition and Metabolism (ESPEN) consensus. Both definitions of malnutrition have been recently developed to reach an international consensus statement on the diagnosis of malnutrition(18). While the GLIM Criteria have yet to be applied in geriatric care, the ESPEN consensus criteria are reliable, appropriate (19)(20)(21), and have predictive values for outcomes (4)(6)(22)(23) in geriatric populations. Other international societies, such as the American Society of Parenteral and Enteral Nutrition (ASPEN) and the Academy of Nutrition and Dietetics (AND), have proposed their own sets of clinical criteria (24), and other tools are widely used, like the Mini-Nutritional Assessment (both extended (MNA) (25) and short form MNA-SF (26)), Graz Malnutrition Screening (27), Nutritional Risk Screening (NRS), and others (28)(21). In addition, serum

albumin concentration, which has been discarded as a nutritional marker by evidence-based recommendations (19), seem to be still in use for malnutrition assessment in clinical practice (29).

In this context, the largest enteral and parenteral societies of nutrition have been lately involved in the development of the GLIM criteria, a proactive process to identify the core attributes that best capture an individual's nutritional status, in order to launch this unified, international definition of malnutrition, suitable for all healthcare professionals worldwide (30), to be accepted by the World Health Organization (WHO) and the International Classification of Diseases (ICD) (23)(31)(32). The European Union Geriatric Medicine Society (EuGMS) has also collaborated in the process (19), as it is essential that this definition is appropriate for use in the ageing population.

Despite recent recommendations to introduce these newly developed, evidence-based diagnostic criteria for malnutrition, their implementation in clinical practice remains insufficient (21) and there are no data about the tools used and the adherence to new criteria. As participants in the European Academy for Medicine of Ageing (EAMA) course, the aim of the present survey was to explore the clinical diagnostic strategy for nutrition assessment currently used in daily practice by healthcare experts in Geriatric Medicine across European countries.

## **METHODS**

**Design:** An online survey of current methods, instruments and available national guidelines used for malnutrition assessment and diagnostics in clinical geriatric healthcare settings across 14 European countries (Table 1).

**Population:** The survey was sent to 40 potentially eligible European geriatricians, specialists in geriatrics or in process of training to become specialists, from 14 European Countries. Participants were selected from Course XII (2017-2018) offered by the European Academy of Medicine of Ageing (EAMA). These postgraduate training courses started in 1995 and are focused on improving networking, establishing specific fields of interest, and providing an opportunity for lifelong learning. EAMA postgraduate students come mostly from European countries and are selected to attend a two-year course of four intensive week-long sessions, led by the Executive Board and invited experts from several disciplines. Two thirds of the graduates have achieved academic positions in geriatrics (33)(34)(35).

**Questionnaire:** The multiple-choice survey instrument contained 19 items in two parts. In the first part, questions referred to respondents' local clinical practice (see questionnaire, additional file 1). Two questions related to the use of serum albumin levels (a traditional indicator which is no longer recommended) (17), and six about the clinical signs and symptoms of malnutrition, which included all the sub-scores of the GLIM criteria (23), the ESPEN consensus, and the ASPEN/AND criteria (in particular assessment of weight loss). The second part of the survey focused on these questions in national guidelines on malnutrition assessment in older adults, if available. EAMA participants designed and populated the questionnaire.

### **Ethics**

National and international research ethics guidelines were followed (36), including the Deontological Code of Ethics, Declaration of Helsinki, and Spain's confidentiality law

concerning personal data (Ley Orgánica 15/1999, 13 December, Protección de Datos de Carácter Personal). Detailed, understandable written information was provided to survey participants, specifying that returning a completed survey would constitute informed consent to participate. Data entered in the study were treated in accordance with the provisions of the applicable data protection law in Spain and the General Data Protection Regulation (GDPR) (EU) 2016/679 of the European Parliament and Council, dated the 27 April of 2016.

### **Statistical analysis**

Descriptive analysis of the sample applied percentages and frequency distributions for categorical variables, and means (SD) for quantitative continuous variables. Univariate analysis compared qualitative variables by Chi-square or Fisher exact test, as appropriate and quantitative variables by Student *t*-test. Univariate models were fitted to determine which of the covariates were statistically significant ( $p < 0.05$ ). Analysis was performed using SPSS 22 (IBM Corporation, SPSS, INC., Chicago, IL, USA).



## **RESULTS**

Thirty-six of the 40 invited EAMA seminar participants (90%), from 14 European countries (**Table 1**), completed the survey. Most of the respondents (n= 29; 80.6%) usually assessed malnutrition in their respective healthcare settings, including outpatient, acute, intermediate, and long-term, geriatric care settings. Nutritionists were involved systematically (n=17; 47.2%) or on demand.

### **Individual clinical practice**

The tools most commonly used to screen for malnutrition were the MNA (n=15; 44.1%), MNA-SF (n=18; 52.9%), and NRS-2002 (n=10; 29.4%). Assessment differed widely, including measurement of daily nutrient intake, clinical criteria alone or, in combination with low serum albumin levels, and validated tools [MNA (n=16; 45.7%); MNA-SF (n=14, 40.0%); ESPEN criteria (n=9; 25.7%)]. The MNA and MNA-SF were the most-used tools for both screening and diagnosis of malnutrition in all geriatric settings. Although the GLIM or ASPEN criteria were not being used to diagnose malnutrition in any of the responses, its components were frequently used as part of the nutritional assessment [weight loss, low energy intake, loss of muscle mass, subcutaneous fat, grip strength, fluid accumulation, and functional impairments].

All respondents consider weight loss and body mass index when diagnosing malnutrition, the most preferred being objective weight measurement (n=32; 88.9%) over self-reported or caregiver-reported weight loss (multiple-choice question). They did not agree on the percentage of weight loss and/or period of time to be considered as cut-off point. Albumin level was still in use as biochemical marker for malnutrition (n=19; 52.8%), with a median cut-off of 3.5 mg/dl.

### **National guidelines**

National guidelines on malnutrition assessment for older adults were lacking in 5 of 14 countries, but geriatricians in countries with national guidelines reported optimal compliance (100%). Current European guidelines for older people recommend MNA for screening for malnutrition (n=22; 81.5%), both for community-dwelling and hospitalized older patients. MNA (n=17; 63%) and clinical criteria, alone (n=17; 63%) or in combination with serum albumin levels (n=13; 48.1%), were the most frequently recommended diagnostic tools. Unintentional weight loss, preferably measured objectively by patient's weight, was the most frequently recommended clinical variable in national guidelines, followed by BMI and low energy/food intake. The relevant time-period for over which to consider weight loss was not consistent: varying for example from >5% weight loss over the last three months (n=19, 76%) to >10% independent of time (n=5; 32%). Albumin concentration as biochemical marker for malnutrition was still recommended (n=16; 61.5%), with a cut-off point of 3.5 mg/dl (n=8; 50%).

## **DISCUSSION**

This survey provides data on the assessment of nutritional status in clinical practice across 14 of the 28 European Union countries. All respondents reported inclusion of malnutrition assessment as part of their comprehensive geriatric assessment. However, the lack of homogeneity from clinician to clinician, and from country to country across Europe, suggests that implementation of unified validated criteria would greatly help improve its diagnosis and management. Both versions of MNA appear to be the most extensively used tools for screening and diagnosis of malnutrition in community-dwelling and hospitalized patients, without observing significant differences among the different healthcare assistance levels. Extensive use of individualized clinical criteria, mostly subjective and observer-dependent, that (although valuable for clinical purposes) could hinder comparisons between settings and adherence to evidence-based international recommendations. Nutritionists were systematically involved in the settings of half of the respondents, and on demand in a third of them, as part of clinical practice.

In our study, weight loss was the most commonly used clinical criterion for the diagnosis of malnutrition in both the national guidelines and by the geriatricians in their clinical practice, but the percentage and period of time to consider it as abnormal varied widely. Weight loss, one of the strongest indicators of health status in older people (19), is included in the GLIM criteria (23) and the ESPEN consensus due to its prognostic value, and also because it can be easily be obtained in all populations worldwide (31)(37). The ESPEN consensus defines the loss of >10%, independent of time period, as relevant for chronic conditions, and the loss of >5% over the last three months for acute illnesses (19). In other guidelines, there is no generalized agreement on the magnitude and time-dependent variation in weight to be considered (24)(38). In our study, weight loss was objectively measured in most settings;

however, the reliance often on subjective, observer-dependent methods or measures based on self-report or caregiver-report (39) highlight the challenge of getting accurate weight longitudinal measurements in geriatric patients.

Surprisingly, serum albumin is still widely used in over 60% of national guidelines and by over 50% of clinicians in geriatric care as a biomarker of malnutrition, despite current evidence-based recommendations to the contrary, due to it being highly influenced by inflammation (19)(20). The frequent use of serum albumin concentration in clinical practice could be related to it still being recommended by some national guidelines (40) (37), and/or resistance to change in routine practices (41).

Malnutrition assessment was mostly based on the items included in ESPEN (19) and ASPEN/AND criteria (24), but use of the ESPEN and ASPEN/AND consensus guidelines was scarce. Disappointingly, four years after the publication of the ESPEN consensus and guidelines (19)(20), intended to be the gold standard for nutritional assessment in Europe, they are not yet specifically included in any of the national guidelines of European countries; without any rationale for its exclusion. The EAMA and the EuGMS share the objective of promoting Geriatric Medicine; this special survey on malnutrition sheds light on one of the main focus areas of EuGMS at present. Implementing a valid, international, and reliable definition of malnutrition for older people in Europe would improve patient care in our geriatric populations.

### **Limitations and strengths of the survey**

Regarding sample characteristics, there is a potential bias because the EAMA seminar participants are only partially representative of European specialists in Geriatrics, i.e. students from some parts of Europe, i.e. Eastern Europe, were poorly present. In addition, this is a selected group of specialists immersed in a learning environment, who might be expected to

follow good practices. Our results require confirmation in a larger sample of Geriatric Medicine specialists.

## **Conclusions**

This survey provides data about the tools and clinical criteria used for malnutrition assessment and diagnosis in 14 European countries. We observed that malnutrition assessment in Geriatrics is usually performed, but the use of unified criteria needs improvement. The MNA and MNA-SF are the most-used tools for both screening and diagnosis of malnutrition in all geriatric settings. The clinical criterion most widely used is weight loss, as recommended by all currently available national guidelines in European countries as well as the GLIM criteria. However, the percentage and timeframe of weight loss should be evaluated to determine if reappraisal is needed. Assessment of malnutrition was based on those items that constitute the sub-scores of the GLIM, ESPEN and ASPEN/AND criteria, without using these validated definitions *per se*.

With the aim of applying emerging research in clinical practice according to the “Action-Research philosophy”(42) evidence-based nutrition assessment should be implemented in clinical practice in Geriatrics. Harmonizing the different national guidelines on malnutrition assessment with the GLIM criteria and ESPEN consensus should be an urgent mission to provide best-evidence care for older people across Europe.

## **Highlights**

Nutritional assessment performed by geriatricians in clinical practice varies widely across European countries.

The clinical criterion most widely used is weight loss; however, percentage weight-loss and time-frame should be evaluated to determine if re-evaluation is needed

Clinical assessment of malnutrition was based on the items that constitute the sub-scores of the GLIM, ESPEN, and ASPEN/AND criteria, without using the three validated definitions

Harmonizing the national guidelines on malnutrition assessment with GLIM criteria and ESPEN consensus might provide best-evidence care for older people across Europe.

## **Acknowledgments**

The authors gratefully acknowledge Mieke Laforce, Elena de León, and Janet Weinberger for providing excellent support to researchers and Elaine Lilly, PhD, for unfailing support, and suggestions.

## **Conflict of interest**

All authors declare they do not have any financial or personal relationships with other people or organizations that could inappropriately influence their work.

## **Author contributions**

DSR, EM, CA, AHR, and NVDN conceived and designed the survey; DSR and EM performed the experiments; DSR, EM, and AHR analyzed and interpreted the data; DSR, EM, CA, and AHR wrote the draft; ML, MTR, AH, BD supervised the draft; all EAMA students from the XII Course, Board Members, and NVDN as EAMA president, read and approved the final version of the manuscript.

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