EDITORIAL

Taking a step toward implementation of Global Leadership Initiative on Malnutrition (GLIM) criteria in geriatric rehabilitation

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The manuscript "Nutritional status and functionality in geriatric rehabilitation patients: a systematic review and meta-analysis" [1] by Wojzischke et al. provides updated evidence on an important topic, lists the tools and criteria used to identify malnutrition, determines its prevalence, and assesses the relationship between malnutrition and functional outcomes in geriatric rehabilitation. We consider the management of nutritional disorders to be a cornerstone in geriatric rehabilitation units as we all seek to administer comprehensive geriatric assessment and intervention programs to improve patients' functional status after a deconditioning, eventually reversible process. To further contextualize the findings of this timely review, the overall objective of this editorial is to raise awareness about malnutrition and nutrition-related diseases in geriatric care. The aim is to help specialists in charge of these units to improve quality of diagnosis and nutritional care in geriatric rehabilitation.

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In older adults, malnutrition is related to impaired functional status, falls [2], decreased probability of being discharged home [3], longer length of hospital stay [4], and higher risk of all-cause mortality [5], whether community-dwelling [6], hospitalized [7], or post-discharge [3]. Unfortunately, proper identification and management of a patient with malnutrition may depend on the diagnostic tool administered [8, 5]. This presents an important challenge for clinicians.

Aware of the adverse consequences of malnutrition in older people and the promising outcomes that are possible with good nutritional care, the European Geriatric Medicine Society (EuGMS) has supported several initiatives aiming to better diagnose malnutrition, i.e., the European Society for Clinical Nutrition and Metabolism (ESPEN) consensus, which provided the first international definition of malnutrition [9], followed by the ESPEN guidelines on definition and terminology of clinical nutrition [10] and the Global Leadership Initiative on Malnutrition (GLIM) criteria [11]. Moreover, initiatives such as the PROT-Age recommendations [12] and the ESPEN guidelines on nutrition and hydration in Geriatrics [13] have been developed to update therapeutic approaches.

Malnutrition would be expected to be more prevalent and produce more severe negative outcomes in those older patients who have recently presented an acute catabolic process and whose metabolic needs are not well balanced [14], such as patients admitted in geriatric rehabilitation units [15]; likewise, an adequate diagnosis and management of malnutrition would be expected to have greater positive impact in these patients [13].

As these units have emerged to meet the needs of different populations and healthcare systems [16], they may differ by country but do share some common characteristics. Among the shared concerns are the disabling (hip fracture, acute stroke) or non-disabling processes (e.g., acute medical conditions) that lead to a loss of physical performance and

independence, along with the need to optimize results within a limited treatment period. The length of the physical therapy program and length of admission in the unit are usually determined by the timeframe during which a deconditioning process remains sensitive to physical therapy interventions, by the achievement of goals, and by conditions of reimbursement from the different health systems. Last but not least, the achievement of a level of physical independence that allows the patient to return home and avoid institutionalization is equally or more important than the use of healthcare resources. A wide variety of standards of effectiveness have been proposed for geriatric rehabilitation [17]; however, most settings use their own pragmatic thresholds in the daily clinical decision-making process.

Apart from variations determined by the local setting and level of therapeutic intensity of the rehabilitation program, approaches differ depending on the relative weight of the rehabilitation therapy vs. patients' other needs. All these considerations should help to establish the roles of specialists leading these settings, who frequently represent Geriatrics and/or Physical Medicine and Rehabilitation Medicine and are supported by interdisciplinary teams of nurses, physiotherapists, social workers, and others who are crucial for improving patient's health during and after a hospital stay. Sharing knowledge and raising awareness about malnutrition and nutrition-related diseases between these medical specialties is well aligned with both research and clinical points of view [18].

However, high-quality evidence on the current assessment of malnutrition in light of the latest findings in geriatric rehabilitation has been lacking, and the meta-analysis by Wojzischke et al. helps to bridge this gap. They report a pooled prevalence of malnutrition of 13% (5–20%) and risk of malnutrition of 47% (40–54%) using the Mini-Nutritional Assessment (MNA) [19, 20] and a prevalence of malnutrition that ranged from 6 to 88% according to other assessment methods. These heterogeneous results confirm that a large percentage of patients remain either undiagnosed and undertreated or overdiagnosed, depending on the assessment tool used [15].

The ESPEN consensus [9] and the GLIM criteria [11] formulated several PICO questions during their respective development processes. One of these was "Which are the individual criteria that better capture the state of malnutrition?" [21]. Wojzischke et al. compiled the list of individual variables that constitute the ESPEN consensus and GLIM criteria as an outline to present the findings of their systematic review and meta-analysis: screening of malnutrition by validated screening tools, such as MNA or MNA-Short Form (MNA-SF) and diagnosis by low body mass index (BMI) < 20 kg/m^2, reduced muscle mass, and reduced nutritional intake. The meta-analysis concluded that 2 of the 3 individual criteria of the ESPEN consensus and 5 of the 6

GLIM criteria were used in the studies identified by their literature search; however, these were applied idiosyncratically, rather than as indicated by a consensus definition. Similar findings have been reported by an international survey on malnutrition assessment and diagnostic methods in clinical practice across European countries [22]. This wide use might indicate acknowledgement by a large percentage of the scientific and clinical community of the criteria that best capture the state of malnutrition, which can be considered promising for an eventual implementation of the GLIM criteria worldwide.

Although low BMI was widely used in the studies identified by the search strategy, this factor alone was not a good indicator of malnutrition, as a large percentage of malnourished patients according to MNA had normal BMI. Moreover, the meta-analysis did not show an association between BMI and physical function, which might indicate that evidence-based tools could be more accurate to diagnose malnutrition than a single phenotypic measurement. This observation is aligned with recent studies showing better performance of GLIM compared to simpler approaches using fewer criteria [23].

Furthermore, malnutrition according to the ESPEN consensus and GLIM criteria has been shown to be a strong predictor (fourfold increased risk) of sarcopenia onset during 5-year follow-up in older people living in the community [24]. However, despite this clear association, Wojzischke et al. [1] reveal a lack of accurate data regarding decreased muscle strength, suggesting that the assessment of muscle mass remains an ongoing challenge in the evaluation of body composition. Although a majority of the reviewed studies did not show data on prevalence of sarcopenia, two studies found high prevalence rates (40% and 76%), which are consistent with the mean prevalence (50%) reported in a review about sarcopenia in older adults during post-acute care and rehabilitation for a special issue of this journal [27]. Notably, the definition of sarcopenia has been recently updated by the European Working Group on Sarcopenia in Older People (EWGSOP2) [25] and could yield different results [26].

Another interesting concept developed by Wojzischke et al. is the association of malnutrition with poor functional outcomes as measured by the Barthel Index (BI) and the Functional Independent Measure (FIM). The findings show that malnutrition has a negative impact on functional outcomes and that worse BI or FIM is associated with malnutrition and/or malnutrition risk. The results also reinforce the importance of systematic screening in clinical practice using a validated tool such as MNA or MNA-SF, as recommended by ESPEN guidelines [13]. A limitation of the systematic review was that the search strategy did not include outcome variables other than BI and FIM during the hospital stay; these measures might not yield adequate information about the dynamic results of a

rehabilitation program. Functional indexes such as absolute functional gain (admission-to-discharge BI change), rehabilitation efficiency index (absolute functional gain over length of stay), relative functional gain (achieved percentage of potential gain), and Heinemann index, among others, are indicators of the results of the intervention, can be used as goals, and help to support the clinical decision-making process in geriatric rehabilitation [17].

Wojzischke et al. present the available evidence about a fascinating, cutting-edge research topic: the effectiveness of the new criteria for the diagnosis of malnutrition and their relationship with nutrition-related diseases. Studies about the capability of the new GLIM criteria to predict adverse health outcomes are still scarce [26] and could be timely. Moreover, further research about pragmatic approaches [27] suitable for bedside assessment will be helpful for the widespread implementation of the ESPEN definition. Despite ESPEN and EuGMS support of the GLIM criteria [28], and the interest that the criteria aroused among European geriatric societies, no European guidelines to date recommend their use [22]. The relative novelty of the GLIM criteria and their limited diffusion among clinicians, the pitfalls of measuring muscle mass [22, 29–31], the still frequent use of serum albumin levels as a measurement of nutritional status [36], and resistance to change in daily practice [32] remain the major limitations for the implementation of the new criteria in clinical practice in geriatric rehabilitation. The meta-analysis published in this issue could be a promising starting point for a line of research in malnutrition and nutrition-related diseases in geriatric rehabilitation designed to improve nutritional care in older people.

Author contributions DSR, DMV, and VDY wrote the manuscript; DSR, DMV, VDY did literature review; EM and ED corrected the manuscript. All co-authors read and approved the final version of the manuscript.

Compliance with ethical standards

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

Ethical approval This study does not contain any studies with human participants performed by any of the authors.

Informed consent For this type of study, formal consent is not required.

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