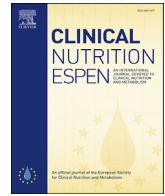




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Opinion Paper

Global Leadership Initiative on Malnutrition (GLIM) for the diagnosis of malnutrition - a framework for consistent dietetic practice



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SUMMARY

Malnutrition is an alarming and ongoing healthcare problem globally. Malnutrition has a negative impact on the individual patient, leading to poorer clinical outcomes and increased mortality, but also poses an economic burden on society. Proper identification and diagnostics are prerequisites for initiation of treatment. In 2019, the Global Leadership Initiative on Malnutrition, a consensus-based global framework to uniformly diagnose malnutrition across populations, healthcare settings, and countries was published.

Identifying and treating malnutrition is an interdisciplinary team effort. Nonetheless, the nutrition and dietetics profession is specifically trained for diagnosing and treating nutrition(-related) conditions, and therefore has a key role in the interdisciplinary team in implementing the GLIM framework in clinical practice. For the nutrition and dietetics profession, GLIM offers a great opportunity for moving both the scientific and clinical knowledge of malnutrition management forward.

While the GLIM framework has been extensively studied since its launch, various knowledge gaps still remain. For the nutrition and dietetics profession, these knowledge gaps mainly relate to the GLIM implementation process, to the role of GLIM in relation to the nutrition care process, and to treatment strategies for various nutrition-related conditions. In this opinion paper, we aimed to describe the rationale for implementing the GLIM framework in clinical dietetic practice, and propose a research agenda based on knowledge gaps regarding GLIM in relation to nutrition care from a dietetic point of view.

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1. Introduction

Malnutrition [1] is an alarming and ongoing healthcare problem globally [2,3]. Malnutrition has a negative impact on the individual

patient, leading to poorer clinical outcomes and increased mortality [3], but also poses an economic burden on society [4,5]. In 2011, a Dutch study revealed that additional costs of managing adult patients with disease-related malnutrition were estimated to be €1.9 billion, equaling 2.1% of the total Dutch national health expenditure at that time [6]. For example, in Canada it has been demonstrated that costs for treating malnourished patients in hospitals are higher than the costs to treat well-nourished patients [7]. Therefore, efficient management of malnutrition is urgent [8,9].

Proper identification and diagnostics are prerequisites for initiation of treatment [10]. Numerous validated malnutrition screening and assessment tools are available in the literature and used in clinical practice [11–15]. Lack of uniformity in screening, assessment and diagnosis methods [16] therefore hinders the development of a consistent and robust body of evidence for evaluating effectiveness of interventions to treat malnutrition.

With the aim to respond to this need for a global consensus to define and characterize malnutrition, in January 2016 the Global Leadership Initiative on Malnutrition (GLIM) was founded by four global clinical nutrition societies. Subsequently, the GLIM framework to uniformly diagnose malnutrition was jointly published by the American Society for Parenteral and Enteral Nutrition (ASPEN) (www.nutritioncare.org), ESPEN (www.espen.org), the Latin American Federation for Nutritional Therapy, Clinical Nutrition and Metabolism (FELANPE) (www.felanpeweb.org), and the Parenteral and Enteral Nutrition Society of Asia (PENSA) (www.pensa-online.org) [17,18]. When developing GLIM, special attention was paid to indicators that would accurately represent the definition of protein-energy malnutrition while remaining appropriate in a variety of settings and contexts (such as outpatient clinics, intensive care units, acute care, residential care, and communities) and globally (applying to different ethnic groups and both high- and low-income countries) [19].

GLIM is a framework consisting of a two-step process. The first is screening to identify “at risk” subjects, utilizing any of the validated screening tools. The second step includes nutritional assessment for diagnosis and severity grading [17,18]. The consensus-based GLIM criteria consist of three phenotypic (i.e., non-volitional weight loss, low body mass index, and reduced muscle mass) and two etiologic criteria (i.e., reduced food intake or assimilation, and inflammation or disease burden) [17,18,21]. To diagnose malnutrition, at least one phenotypic and at least one etiologic criterion needs to be fulfilled. Subsequently, grading severity of malnutrition is based on the severity of the three phenotypic criteria, via specific thresholds [17,18].

While the GLIM framework and its application are being evaluated continuously [22–30], implementation in practice and research is urgently needed [31]. Research indicates that it takes 17–20 years to get clinical innovations that have demonstrated effectiveness into practice, and less than half of all clinical innovations are eventually implemented in daily care [32]. Therefore, the implementation of the GLIM framework should not be postponed, and efforts should be made to stimulate the implementation.

In this opinion paper, we aim to describe: 1) the rationale for implementing the GLIM framework in clinical dietetic practice, and 2) knowledge gaps regarding GLIM in relation to nutrition care from a dietetic point of view.

2. Identification, diagnosing, treating and monitoring malnutrition: an interdisciplinary team effort

Since malnutrition is a multidimensional and complex condition [12], identifying, diagnosing, treating malnutrition, and monitoring effects of interventions require expertise and skills from various

disciplines. While the composition of the interdisciplinary team may differ between settings and countries, the intensity of the collaboration between the disciplines may also differ per patient. The dietitian, physician, and nurse, and in some countries the dietitian technician/assistant or undergraduate nurse, or similar disciplines are key for successful nutrition therapy. The physician has the overall medical responsibility, including decision making regarding final stage palliative care, and the dietitian has a key role in investigating and decision making regarding the choice of nutrition therapy. The nurse also has an important role in nutritional care. By identifying problems with food intake, as well as supporting and encouraging the patient, the nurse is responsible for carrying out the nutrition therapy, most effectively assisted by the undergraduate nurse, dietitian technician, or similar disciplines. In addition to these professions, occupational therapists, physiotherapists, speech therapists, pharmacists, dentists, and oral hygienists also play important roles depending on the condition of the patient. This includes optimization of health or environmental conditions that could facilitate adequate food intake, or treating symptoms or conditions that may hinder food intake.

To enable initiation of nutrition therapy, malnutrition including its risk factors needs to be identified. Globally, malnutrition risk screening is widely performed upon hospital admission, to systematically identify malnutrition and/or malnutrition risk. Malnutrition risk screening is usually performed by the (undergraduate) nurse, although some screening instruments are completed by the patient, assisted by a nurse if needed. Unfortunately, in various settings, for example in primary care, malnutrition risk screening is not yet routine. In these settings, the dietitian is not always well represented and other professionals' expertise and skills required to identify malnutrition and/or its risk factors are often poor. Moreover, in low- and middle-income countries, diagnosing malnutrition has additional challenges, due to for example scarcity of measurement tools like weighing scales and bio-electrical impedance devices [20].

Monitoring the effectiveness of nutrition treatment also requires interdisciplinary collaboration. Collaboration between the dietitian, nurse, physician, and undergraduate nurse, dietitian technician or similar disciplines are crucial to evaluate food intake and presence of factors hindering adequate food intake, such as medication, psychosocial considerations and disease-related symptoms, as well as changes in nutritional requirements and status.

3. Role of nutrition and dietetics professionals in the use of the GLIM framework

While diagnosing and treating malnutrition is an interdisciplinary team effort, the nutrition and dietetics profession is specifically trained for these tasks, and therefore has a key role in the interdisciplinary team in implementing the GLIM framework in clinical practice [33–35].

Registered nutrition and dietetics professionals use a structured process, i.e., the nutrition care process (NCP), for nutrition diagnosis and person-centered treatment of individual patients [36,37]. GLIM, as an evidence-based framework, fits well in this process. In fact, both the NCP and GLIM framework focus on etiology identification, which is then considered essential to guide intervention and anticipated outcomes. However, dietitians are also active in quality improvement and patient safety issues, both of which align in addressing malnutrition [38]. GLIM has the potential to serve as an important framework in that context as an evidence-based and well established way to diagnose malnutrition [33]. Taken together, the knowledge, skills including a person-centered approach [39], mission and ambition of the nutrition and

dietetics profession will benefit from use of the GLIM criteria to serve as best practice in the nutritional care of malnourished individuals [38]. Here it should be stressed that implementation into education of nutrition and dietetics students, as well as into lifelong learning programs of the nutrition and dietetics profession on how to use and integrate GLIM into clinical practice is a prerequisite.

4. The GLIM framework for the global documentation of malnutrition

Standardized evidence-based terminology for patient safe communication and documentation is crucial. The International Classifications of Diseases (ICD) is the foundation for the identification of diseases and statistics globally [40]. Therefore, representatives of the global nutrition community, i.e., more than 40 international clinical nutrition societies including dietetics organizations, together with patient representatives, and in collaboration with the Swedish National Board of Health and Welfare, proposed to WHO/ICD-11 that ICD-11 should be amended by a code for the diagnosis of “Malnutrition in adults” in accordance with the GLIM framework [41].

5. GLIM research agenda

For the nutrition and dietetics profession, GLIM offers a great opportunity moving both the scientific and clinical knowledge of malnutrition management forward. A well-founded malnutrition diagnosis serves as the prerequisite for the choice of treatment strategy.

The GLIM framework has been extensively studied since its launch [23–30], however, various knowledge gaps still remain. For the nutrition and dietetics profession, these knowledge gaps mainly relate to the GLIM implementation process, to the role of GLIM in relation to the NCP, and to treatment strategies for various nutrition-related conditions. These knowledge gaps, as well as examples of proposed research questions are discussed below.

5.1. Research questions in relation to implementation of GLIM

To guide members of the interdisciplinary team in implementing GLIM into daily practice, knowledge is needed about the readiness of healthcare professionals to work with the GLIM framework. While the global GLIM Implementation Working Group has identified current practices, as well as barriers and facilitators in a global survey (to be published), additional knowledge gaps need to be filled regarding the implementation of GLIM.

Therefore, answers to the following research questions are needed:

- How can readiness of professionals and policy makers for implementing GLIM be optimized?
- How feasible is implementation of the GLIM criteria in the inpatient, outpatient, and community setting?
- How can the GLIM framework be optimally implemented in the inpatient, outpatient, and community setting? What are the barriers, facilitators, needs and wishes of professionals and patients regarding implementation of GLIM in low resource settings?
- How can the GLIM framework be implemented in low resource settings?
- How can the GLIM framework be applied and implemented in other global settings, like famine?
- How can the interdisciplinary team best facilitate the implementation of the GLIM framework?

- How can existing tools (e.g., Subjective Global Assessment, Patient-Generated Subjective Global Assessment, Mini Nutritional Assessment, NRS 2002) be used as basis for applying the GLIM framework?
- Is applying the GLIM framework in daily practice cost-effective, for example, as compared to usual care?
- Does the use of the GLIM framework improve nutritional care and outcomes?

5.2. Research questions in relation to the role of GLIM in the nutrition care process and clinical outcomes

While the validity including predictive ability of the GLIM criteria has been widely demonstrated already [23,27–29], the evidence base for validity of the GLIM criteria in specific populations, such as the critically ill, needs to be further strengthened [24]. For example, previous research identified that variation in the operationalization of the etiologic criteria on ‘reduced food intake/assimilation’ and ‘inflammation/disease burden’ results in varying predictive ability of the GLIM diagnosis for survival [27]. Moreover, more knowledge on how the choice of methods for applying each of the GLIM criteria influences the accuracy of the GLIM criteria is needed [26]. Therefore, answers to the following research questions are needed:

- How does the operationalization of each of the etiologic GLIM criteria affect accuracy and predictive ability of the GLIM malnutrition diagnosis in various populations and settings?
- What is the reliability of assessing each of the GLIM criteria in general and discipline-specific?
- Which combinations of the GLIM criteria contribute to the GLIM malnutrition diagnosis per medical diagnosis and per patient population?
- Which combinations of GLIM criteria predispose to worse outcomes per patient population?
- What is the prevalence of malnutrition according to GLIM per population, and per healthcare setting?
- How can the different combinations of the GLIM criteria help to categorize patients according to the main malnutrition subtypes (i.e., disease-related malnutrition with inflammation, disease-related malnutrition without inflammation, and malnutrition without disease)?
- How do different combinations of GLIM criteria impact required dietary treatment?
- How does utilization of the GLIM framework lead to (cost-) effective interventions that improve outcomes?

The proposed research questions focus on understanding mechanisms underlying successful implementation of GLIM and mechanisms underlying the impact of the GLIM framework on clinical outcomes. Therefore, we recommend the use of qualitative research (e.g., interviews, focus groups), as well as action and design research, in addition to quantitative research, eventually in a mixed method design, in which the two types of research can enrich each other in the understanding of how GLIM can improve nutritional care for the patient.

Furthermore, we recommend using the Medical Research Council's framework for developing and evaluating complex interventions [42]. This framework challenges the notion that the main objective of evaluation is to provide objective estimations of effectiveness. It claims that it is equally crucial to improve theories and comprehend how interventions affect change, including how they engage with context and larger dynamic systems.

To move this GLIM research agenda forward, it should be discussed within the global dietetics organizations, as well as with representatives from other professional organizations and patient organizations, to translate the research agenda into research projects, in co-creation with professionals and patients around the globe.

6. Conclusion

The GLIM framework provides a globally accepted foundation for a uniform diagnosis of malnutrition and for clinical management initiating adequate and effective interventions. Optimal nutrition care, as well as implementation and application of the GLIM framework in daily practice requires close collaboration between various disciplines, with a person-centered view of the patient. Within the interdisciplinary team, the nutrition and dietetics profession has a key role, being specifically trained to diagnose, treat and manage nutrition(-related) conditions. Widespread use of the GLIM framework will ultimately contribute to more effective treatment of malnutrition. Moreover, research utilizing the GLIM framework will generate new insights to bridge significant knowledge gaps for future achievements in the care of malnourished persons.

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Author contribution

Elisabet Rothenberg: Conceptualization, Writing - Original draft preparation, Supervision; **Amalia Tsagari:** Conceptualization, Writing - Original draft preparation; **Nicole Erickson:** Conceptualization, Writing - Reviewing and Editing, **Christina N. Katsagoni:** Conceptualization, Writing - Reviewing and Editing, **Ainsley Malone:** Conceptualization, Writing - Reviewing and Editing, **Marian de van der Schueren:** Conceptualization, Writing - Reviewing and Editing, **Clare Shaw:** Conceptualization, Writing - Reviewing and Editing, **Alison Steiber:** Conceptualization, Writing - Reviewing and Editing, **Darija Vranesic Bender:** Conceptualization, Writing - Reviewing and Editing, **Harriët Jager-Wittenaar:** Conceptualization, Writing - Original draft preparation, Project administration, Supervision.

Declaration of competing interest

NE has received speaker honoraria from CSL Behring, Fresenius-Kabi GmbH, Baxter, Janssen-Cilag GmbH, Cognitendo GmbH, Nutricia and GHD GmbH. She served on the Expert advisory board at Baxter, received consulting fees from Fresenius, and received compensation for writing articles from Klarigo Verlag and Havas Lynxx Group. None of these activities were related to the content of this article. CS has received honoraria from Nutricia for attendance at a clinical expert meeting. All remaining authors declared no conflicts of interest.

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