Nutritional risk screening: a need to guide Alice in Nutritionland

Harriët Jager-Wittenaar[a,b,c], *Martine Sealy*[a], *Elke Naumann*[d] *and Marian de van der Schueren*[d,e]

Purpose of review
With the shifts in society, healthcare and the profile of the malnourished individual, a re-consideration of the goal of nutritional risk screening is needed: screening for malnutrition, or screening for risk of malnutrition? In this review article, we reflect on the role of nutritional risk screening in relation to prevention and treatment of malnutrition.

Recent findings
Within the Global Leadership Initiative on Malnutrition (GLIM) Initiative, modified Delphi studies are currently being conducted to reach global consensus on the conceptual definition and operationalization of 'risk of malnutrition'. This is necessary because various studies have demonstrated that different nutritional screening tools identify different individuals, due to variability in screening tool criteria, which influences GLIM outcomes. Upon screening, three different situations can be distinguished: having risk factors for malnutrition without clear signs of presence of malnutrition, having mild signs of malnutrition (malnutrition in progress), or having obvious signs of malnutrition.

Summary
The outcomes of the studies on 'risk of malnutrition' will guide the screening step within the GLIM process, and will help professionals to make informed choices regarding screening policy and screening tool(s).

Keywords
malnutrition, prevention, risk of malnutrition, screening

INTRODUCTION

Nutritional risk screening has been considered a crucial step in the nutritional care process for >20 years [1]. Within the clinical nutrition community, nutritional risk screening has been defined as "a rapid process performed to identify subjects at nutritional risk and to triage for nutritional interventions". Nutritional risk screening is usually performed by a nurse, food assistant, or similar discipline, or by the patient himself (i.e., self-screening), and should be performed using a screening tool valid for the target group (e.g., children, adults, older adults) and setting (e.g., hospital, nursing home, community). Individuals identified being at risk of malnutrition need to undergo nutritional assessment by a trained nutritional professional [2]. In parallel, the diagnosis of malnutrition should be made according to the Global Leadership Initiative on Malnutrition (GLIM) criteria [3].

The GLIM was established in January 2016, to address the needs of the clinical nutrition and medical communities for a global uniform process to diagnose malnutrition in a range of settings and contexts, both globally (applying to various ethnic groups and both high- and low-income countries) and locally (in all healthcare settings). Over a period of 3 years (2016–2018), the consensus-based GLIM criteria were developed by collective leadership of

[a]Hanze University of Applied Sciences, Research Group Healthy Ageing, Allied Health Care and Nursing, Groningen, [b]Radboud University Medical Center, Department of Gastroenterology and Hepatology, Dietetics, Nijmegen, The Netherlands, [c]Vrije Universiteit Brussel, Faculty of Physical Education and Physiotherapy, Department Physiotherapy and Human Anatomy, Research Unit Experimental Anatomy, Brussels, Belgium, [d]Department of Nutrition, Dietetics and Lifestyle, HAN University of Applied Sciences, Nijmegen and [e]Division of Human Nutrition and Health, Wageningen University & Research, Wageningen, The Netherlands

Correspondence to Harriët Jager-Wittenaar, Hanze University of Applied Sciences, Research Group Healthy Ageing, Petrus Driessenstraat 3, 9714 CA Groningen, The Netherlands. E-mail: ha.jager@pl.hanze.nl

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KEY POINTS

- Changes in society and healthcare require re-evaluating current practices and policies regarding nutritional risk screening.
- A global conceptual definition of risk of malnutrition is being developed.
- Currently available nutritional screening tools identify individuals with risk factors for malnutrition, or patients with (mild) signs of malnutrition, or combinations.
- Screening policies should distinguish between screening for risk of malnutrition (preventive) and screening for malnutrition (reactive).
- A new research perspective is needed to validate screening tools aimed at screening for risk of malnutrition, due to lack of a reference method for risk of malnutrition.

four major clinical nutrition societies, that is, the American Society for Parenteral and Enteral Nutrition (ASPEN), the European Society for Clinical Nutrition and Metabolism (ESPEN), Federación Latinoamericana de Terapia Nutricional, Nutrición Clínica y Metabolismo (FELANPE), and the Parenteral and Enteral Nutrition Society of Asia (PENSA). The first step in the GLIM process is nutritional screening with any validated screening tool. Those found to be at risk will undergo further assessment and diagnosis. According to GLIM, malnutrition is diagnosed when at least one of the three phenotypic criteria (i.e., nonvolitional weight loss, low body mass index, and reduced muscle mass) and at least one of the two etiologic criteria (i.e., decreased food intake or absorption, and inflammation or disease burden) are met. Subsequently, severity of malnutrition is graded based on the three phenotypic criteria, using predetermined thresholds [3].

Changes in society and healthcare require re-evaluating current practices and policies regarding the first step of the GLIM process, that is, nutritional risk screening. People live longer and the pressure on the healthcare systems requires that older adults live independently as long as possible [4]. In addition, the profile of the malnourished individual has changed, for example, nearly 40% of the world population is obese and they often have several co-morbidities [5]. It is unclear whether current screening policies and screening tools sufficiently meet current needs for a more preventive approach to tackle malnutrition. Also, dietitians have reported that malnourished individuals are referred too late [6]. It has been hypothesized that earlier detection and interventions addressing risk factors for malnutrition may have a positive effect on nutritional status or even prevent malnutrition, at least in some individuals [7▪▪,8]. Hence, the question arises whether individuals should be screened for risk of malnutrition, rather than screened for presence of malnutrition? With most nutritional screening tools relying on characteristics of malnutrition (e.g., weight loss, reduced muscle mass, low body mass index), the clinical nutrition community needs to re-consider the goal of nutritional screening, to have the largest impact on the micro (i.e., individual) level, meso (i.e., organizational) level, and macro (i.e., national and international) level [9▪].

In this review article, we reflect on the current role of nutritional risk screening in relation to prevention and treatment of malnutrition.

Impact of choice of screening tool

In the past decades, much effort has been put into getting nutritional risk screening on the agenda worldwide. These efforts have been successful and have even led to mandatory nutritional risk screening in hospitals in various countries. However, international guidelines lack clarity on how to select the screening tool to be used. For example, the ESPEN screening guidelines recommend three specific tools for nutritional screening, depending on the healthcare setting [1], while in the two-step process of the GLIM, it is recommended to use 'any validated tool' for the screening step. In addition, in the ESPEN guidelines for nutritional screening, it was stated that the overall aim of nutritional risk screening is to detect patients who might benefit from nutritional support [1]. To complicate the selection of a screening tool even further, multiple screening tools are currently used across various populations and healthcare settings. However, overlap often exists between populations and settings [10,11▪▪]. For example, when screening older patients with cancer in a hospital setting, one may consider using a screening tool designed for the older adult population, for the cancer population, or for the hospital setting. As such, determining which screening tool best suits the patient and situation is often considered difficult.

Different nutritional screening tools identify different individuals [10,11▪▪,12–17]. The criteria in the various available screening tools have different characteristics, that is, they combine different risk factors for malnutrition, phenotypic criteria, and/or etiologic criteria [9▪]. As a result and depending on the screening tool, a positive screening result may entail one of three possible situations, or a combination of these situations: having risk factors

for malnutrition (e.g., nutrition impact symptoms) without clear signs of presence of malnutrition, having mild signs of malnutrition (e.g., little weight loss or slightly reduced muscle mass) indicating that the development of malnutrition is in progress, or having signs of presence of malnutrition (e.g., weight loss meeting cut-off values for malnutrition; which could be considered 'probable malnutrition') (Fig. 1). While studies have reported sufficient agreement between screening tools and the GLIM-criteria [12], this variety in situations may explain why multiple studies demonstrated that the prevalence of malnutrition according to the GLIM diagnosis depends on the screening tool applied in the first step of the GLIM-process [13–20]. However, it should be questioned whether all three situations as identified by screening tools should be labelled as 'risk of malnutrition'.

Risk of malnutrition as concept

'Malnutrition' has been conceptually defined as "a state resulting from lack of intake or uptake of nutrition that leads to altered body composition (decreased fat free mass) and body cell mass leading to diminished physical and mental function and impaired clinical outcome from disease" [2]. However, for risk of malnutrition, no conceptual definition, that is, a textual description, is available. Only the process of screening, that may result in an individual being categorized 'at risk of malnutrition', has been defined [2]. Moreover, in the literature, different terms are used interchangeably, like 'malnutrition risk', 'nutritional risk', and 'risk of malnutrition'. As a result, the meaning of 'risk of malnutrition' is perceived differently, which may further complicate the understanding of the concept of both risk of malnutrition and the concept of malnutrition, as well as the recognition of need for nutritional interventions.

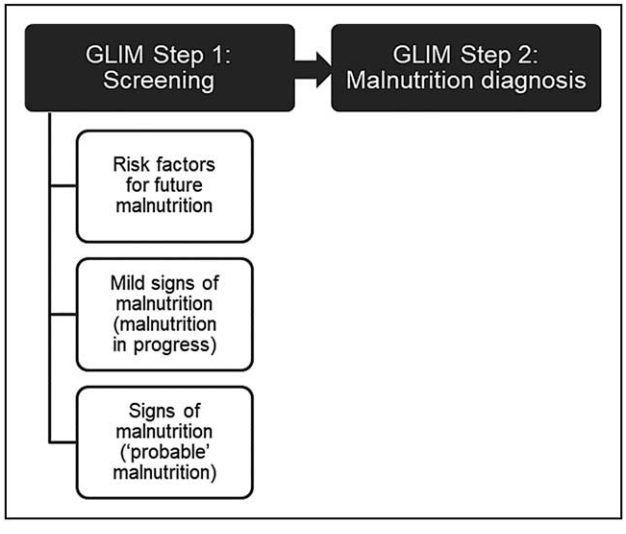

FIGURE 1. Situations identified by nutritional screening tools.

To create global understanding and uniform language in relation to risk of malnutrition, it is important to distinguish three steps in defining the concept of 'risk of malnutrition': conceptualization, operationalization, and measurement. Conceptualization of 'risk of malnutrition' refers to the process of specifying what we mean with 'risk of malnutrition', while operationalization is the process of converting the theoretical concept into quantifiable domains of indicators of 'risk of malnutrition'. Measurement focuses on how these domains should be practically assessed (e.g., selection of items and cut-off values). 'Risk of malnutrition' is currently being measured without an underlying conceptual definition and operationalization of the concept. As a result, positive screening results with different nutritional screening tools identify different individuals at different phases in the course from having risk factors for malnutrition to developing malnutrition, indicated by the three situations as described in Fig. 1. This phenomenon implies that current practices regarding nutritional screening do not clearly distinguish between these situations, depending on the screening tool applied.

Developments regarding nutritional risk screening within Global Leadership Initiative on Malnutrition

Distinction between a state in which an individual has risk factors for malnutrition but is not yet malnourished, and a state in which the individual has signs of malnutrition has therapeutic and prognostic implications. For an individual with risk factors for malnutrition only, interventions should aim at prevention of the onset of malnutrition, while for an individual (almost) malnourished, interventions should aim at treating malnutrition and its underlying etiology, that is, improving or maintaining nutritional status. Thus, further conceptualization, and subsequently operationalization and measurement of the concept of 'risk of malnutrition' is important for professionals and patients, to adequately categorize an individuals' nutritional status and to define realistic goals of nutritional intervention. Moreover, this distinction is relevant to policy makers, as not only nutritional interventions to treat malnutrition require reimbursement; nutritional interventions to prevent malnutrition also require reimbursement, especially in the era where 'ageing at home' is stimulated. Subsequently, further guidance is needed on which screening tool

best fits a specific malnutrition policy, for example, focusing on identifying and treating risk factors for future malnutrition (i.e., a proactive and preventive policy) versus focusing on signs of malnutrition (i.e., a reactive policy). In other words, we need to guide Alice in Nutritionland (Fig. 2). When Alice met the crossroads in Wonderland, she asked the Cheshire Cat "Would you tell me, please, which way I ought to go from here?" The Cheshire Cat answered: "That depends a good deal on where you want to get to." This quote illustrates the importance of setting goals for prevention and treatment of (risk of) malnutrition from a clear vision, in order to be able to choose the path that fits the patient's needs in screening and diagnosis of (risk of) malnutrition.

To reach global consensus on the conceptual definition and operationalization of 'risk of malnutrition', a series of two modified Delphi studies are currently being conducted within the GLIM Initiative. The first modified Delphi study aims to reach consensus on a conceptual definition of 'risk of malnutrition'. To explore the concept of risk of malnutrition, perceptions from both global professional experts and patient advocates and older adult advocates have been identified in online focus group meetings. Their perceptions have served as input for the statements on which professional experts have voted in the online questionnaire rounds. These questionnaire rounds were targeted at reaching consensus on whether the concept of risk of malnutrition should include having risk factors for malnutrition, or having signs of presence of malnutrition, or a combination of both.

The results of the first modified Delphi study are expected in 2024. Subsequently, a second modified Delphi study aims to operationalize the conceptual definition of 'risk of malnutrition', and to define goals of screening.

Implications for practice

Based on the outcomes of the two modified Delphi studies, recommendations will be given to enable professionals to make informed choices regarding: 1) a specific screening policy, i.e., a proactive policy by screening for risk factors for future malnutrition, or a reactive policy by screening for mild signs of malnutrition/malnutrition in progress, or screening for signs of malnutrition/'probable malnutrition', or a combination of both, and 2) which screening tool

FIGURE 2. Alice in Nutritionland.

(s) would serve their preferred selected malnutrition policy in their specific setting. Given the large number of screening tools available and their varying characteristics, it is expected that a new screening tool would not be necessary. However, if a change from a reactive screening policy to a proactive screening policy is preferred, it is important to know which screening tool best meets the newly defined goals of screening. Moreover, intervention strategies in relation to currently applied screening tools may require revision. For example, interventions for individuals with a screening result 'high risk of malnutrition' often are well described, and include an energy and protein enriched diet and referral to a dietitian. However, interventions for individuals with risk factors for future malnutrition or with malnutrition in progress are less well described or even lacking [21]. These individuals may become malnourished later on if not intervened upon. In a recent study that applied the Malnutrition Universal Screening Tool, it has been demonstrated that dietary counseling not only benefits individuals categorized as having high risk, but also patients with moderate risk [22]. Therefore, new screening approaches should not focus on the type of screening tool only, but may become more effective in relation to reducing prevalence of malnutrition worldwide if more and earlier (intensive) interventions, for example, including dietary counselling, are started in individuals with risk factors for future malnutrition as well.

While the GLIM-process currently recommends to perform nutritional assessment in individuals with a positive screening result, it should be further specified in which situations nutritional assessment should be performed. For example, if the nutritional screening identifies an individual with risk factors for malnutrition without signs of malnutrition, one could argue that nutritional assessment is not yet necessary, and the GLIM-criteria do not have to be applied yet.

Moreover, more attention should be paid to who would benefit from screening at all. Recent research has demonstrated that various screening tools may demonstrate poor diagnostic accuracy (e.g., low sensitivity and low positive predictive value) in older hospitalized patients when compared to the GLIM-criteria [15]. Although further research is required to determine if this phenomenon also occurs in other populations, this finding raises the question whether a screening tool is always required prior to applying the GLIM-criteria. For example, if information required to apply the GLIM-criteria is available, for example, by electronic health records, it may be efficient and effective to omit the screening process. However, healthcare professionals and policy makers should be aware that a policy of diagnosing malnutrition diagnosis without prior risk screening would imply a reactive screening for malnutrition policy, rather than a proactive screening for risk of malnutrition policy. Hence, such procedures would only identify and treat malnutrition, rather than treating risk of malnutrition, i.e., preventing malnutrition and its negative impact on health outcomes.

Implications for research

Redefining the concept of risk of malnutrition also requires a paradigm shift in how to evaluate appropriateness of screening tools. Thus far, multiple studies have been performed to determine diagnostic accuracy of screening tools, in which high sensitivity, specificity, as well as high positive and negative predictive value of the screening tool indicate good diagnostic accuracy. Diagnostic accuracy is a well accepted method to determine validity of screening tools. However, it should be noted that diagnostic accuracy can only be applied in the evaluation of screening tools that aim to screen for malnutrition, and not for tools that aim to screen for risk of malnutrition, since diagnostic accuracy analyses require comparison to a reference method, which is not available for 'risk of malnutrition'.

CONCLUSION

Global understanding and uniform language in relation to the concept 'risk of malnutrition' will help to create a global paradigm shift in how to tackle malnutrition. While identification of malnourished individuals has been on the agenda for more than two decades, the development of a conceptual definition of 'risk of malnutrition', its operationalization and further guidance on screening policies will help to place prevention of malnutrition on the global agenda as well.

Conceptualizing 'risk of malnutrition' also has implications for future research. Validation of screening tools that mainly address risk factors for malnutrition may require different research methods and study designs. For example, if the concept 'risk of malnutrition' would include the individuals with risk factors without clear signs of malnutrition, we would recommend validating nutritional screening tools by determining their predictive validity rather than diagnostic accuracy. Furthermore, to determine predictive validity of a screening tool, the effect of the nutritional interventions initiated based on the screening result should be taken into account, to clarify the

relationship between the screening result and changes in nutritional status and clinical outcomes over time.

Lastly, distinction between screening for risk of malnutrition and screening for malnutrition will help to gain further insight into the effectiveness of screening in relation to both prevention and treatment of malnutrition in various settings and populations.

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Conflicts of interest

H. Jager-Wittenaar was co-developer of the PG-SGA-based Pt-Global web tool.

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