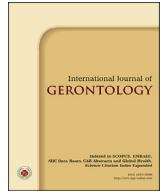


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## Review Article

## Malnutrition in Hospitalized Older Patients: Management Strategies to Improve Patient Care and Clinical Outcomes

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## SUMMARY

Hospital malnutrition is estimated to affect as many as one in two patients at admission, while many others develop malnutrition throughout hospitalization. Despite being a common and long-standing problem among older adults, it is often unrecognized and associated with increased use of resources and negative outcomes such as increased complications, length of stay and mortality. Nutritional screening and assessment are readily available and inexpensive procedures that provide crucial information to develop nutrition care plans. These plans should determine the need for dietary modifications, enteral or parenteral nutrition, strategies for monitoring adverse events and therapeutic success, and parameters for therapy termination. Peculiarities of the geriatric context also need to be addressed, including the level of feeding assistance that will be required and the existence of conditions such as dementia, delirium and dysphagia. Providers should remain vigilant to potential adverse events that might result from nutritional interventions, working to prevent and correct them. Refeeding syndrome is of particular concern as a life-threatening condition. Finally, successful transition of care and adequate nutrition after discharge should also be a standing part of the nutrition care plan, and include patient/caregiver education.

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## 1. Background

One of the persisting challenges of patient care quality and safety is hospital-based malnutrition. Malnutrition affects patients from every age group and weight range, but older adults are particularly vulnerable.<sup>1</sup> It is estimated that up to 50% of patients are malnourished upon admission and many others develop malnutrition during hospitalization.<sup>2</sup> Despite being so frequent, malnutrition remains under-diagnosed and untreated, and is sometimes referred to as the “skeleton in the hospital closet”.<sup>3,4</sup>

Unfavorable outcomes associated with hospital-based malnutrition represent an important problem to healthcare systems.<sup>5–7</sup> For instance, a study that examined nationally representative data describing hospital discharges in the United States found that there was a three-fold increase in hospital costs when patients were malnourished.<sup>6</sup> Moreover, malnourished patients are twice as

likely to develop pressure ulcers and three times as likely to have infections. Almost half of the patients who fall during hospitalization are reported to be malnourished.<sup>8</sup> Finally, older adults who are admitted to the hospital with malnutrition are more likely to have longer hospital stays and die before discharge.<sup>9</sup>

As healthcare systems are increasingly driven by goals focused on high-quality and affordable care, it is vital to address hospital malnutrition and provide adequate nutritional therapy. Unfortunately, clear effects of nutritional therapy on negative outcomes are still under investigation.<sup>10</sup> Trials addressing nutritional interventions are complicated by the inconsistency of malnutrition definitions and the variety of measures that are analyzed.<sup>11</sup> Still, data from meta-analyses suggest possible benefits from these therapies.<sup>12</sup> Interventions are reported to reduce up to two days in hospital stay, reduce readmissions by up to 7%, and cut costs in more than 20%.<sup>13</sup>

We will focus this narrative review on current nutrition management strategies to improve older patient care and outcomes in the hospital. We sought to do that using several sources, including peer-reviewed literature and guidelines from leading organizations that work to prevent and treat malnutrition in the hospital setting.

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We used search terms including “nutrition care”, “hospital care”, “acute care”, “malnutrition”, “screening”, “assessment”, “prognosis”, “treatment plans”, “elderly”, “older adults” and their variations.

## 2. Nutritional screening and assessment

Malnutrition is commonly multifactorial in older adults and potential causes include decreased appetite, depression, functional dependency, cognitive impairment, polypharmacy, inadequate socioeconomic conditions, chewing and swallowing problems, loneliness.<sup>14</sup> A recent systematic review has additionally indicated that older age, institutionalization, constipation and Parkinson's disease are risk factors for malnutrition in older adults. Acute illnesses may also contribute by increasing nutritional requirements and altering metabolism. Finally, both acute and chronic inflammation have been identified as important causes of catabolism, generating sarcopenia and frailty.<sup>15</sup> Knowing that at least some of these conditions are susceptible to intervention, it is important to screen for malnutrition risk, and, once it is identified, perform a detailed assessment and develop a nutrition care plan.

There is good evidence that all patients in acute care hospitals should be screened for malnutrition risk within the first 24 h of admission and periodically rescreened throughout their stay.<sup>2,16</sup> It is further recommended that patients identified as at risk for malnutrition be assessed to measure baseline nutritional characteristics, identify specific nutritional deficits and needs, and explore medical, psychosocial and socioeconomic factors that might be relevant to the nutrition care plan.<sup>16</sup>

Although one undisputed tool for nutritional evaluation does not exist, there are several well accepted instruments available to perform nutritional screening and assessment (Table 1).<sup>17</sup> In summary, they should be able to determine not only caloric intake, but also severity and duration of disease, and possible causes of the deficits.<sup>16</sup> Nutritional assessment tools are generally comprised by the following sections: history; physical examination; laboratory tests; calculation of caloric necessities; and indications for nutritional therapy (Table 2).<sup>2</sup>

The Subjective Global Assessment (SGA) is one of the most widespread nutritional assessment instruments and classifies patients as well-nourished, mildly/moderately malnourished and severely malnourished. It uses data on weight change, dietary intake change, gastrointestinal symptoms, changes in functional status, subcutaneous fat, muscle wasting, edema and ascites, and

has been shown to have a high degree of inter-rater reproducibility.<sup>18</sup> Another advantage of the SGA is that its subjective nature emphasizes the importance of clinical judgment when assessing nutritional status.

The Mini Nutrition Assessment (MNA) evaluates eighteen items to establish whether a patient is at risk of or suffering from malnutrition. The short-form MNA (MNA-SF) has also been validated to identify nutritional status.<sup>19</sup> It uses a combination of six questions from the full MNA regarding food intake, weight loss, mobility, acute illness, neuropsychological problems, and anthropometrical measures. The MNA was developed to be used for older adults in hospitals, nursing homes or community.

Other nutritional assessment instruments include the Short Assessment Questionnaire, which was created to detect malnutrition in hospitalized patients and is useful because it indicates the need for dietetic referrals and suggests preliminary nutritional treatments plans.<sup>20</sup> The Malnutrition Screening Tool is a good option to be used by non-nutrition-trained staff to identify patients at high risk for malnutrition, as it is simple and has only three questions evaluating weight and appetite loss.<sup>21</sup> A related instrument assessing body mass index (BMI), weight loss, and the presence of serious diseases, the Malnutrition Universal Screening Tool (MUST) diagnoses both malnutrition and obesity and has been validated both for hospitals and nursing homes.<sup>22</sup> The Nutritional Risk Screening (NRS-2002) can also be useful to identify malnourished hospitalized patients, generating nutrition risk scores according to data on weight loss, decreased BMI, reduced dietary intake and disease severity.<sup>23</sup>

There have been a number of investigations comparing the use of screening tools to predict malnutrition in older adults. Poullia et al (2012) found in a cohort of 248 in-hospital patients that MUST performed better as a screening instrument as compared to five other instruments, with a validity coefficient of 0.77.<sup>24</sup> They also reported that the SGA had a better rater agreement and that the NRS-2002 appeared to overestimate nutritional risk in older adults. Recently, another study compared five malnutrition screening tools in a cohort of 141 hospitalized older adults, and also verified that MUST appeared to be the most valid instrument for this population.<sup>25</sup> On the other hand, they reported that MNA-SF overestimated nutritional risk in their analysis.

Despite many of the malnutrition screening tools using biochemical markers in their assessment, such as albumin, prealbumin and transferrin, their efficacy as predictors of nutritional status are not consensual, since their levels might be influenced by

**Table 1**  
Screening and assessment instruments.

Instruments	Measures
<b>Screening tools</b>	
Birmingham Nutrition Risk Score <sup>48</sup>	Weight loss, BMI, appetite, ability to eat, severity of diagnosis
Malnutrition Screening Tool <sup>49</sup>	Appetite, unintentional weight loss
Malnutrition Universal Screening Tool <sup>50</sup>	BMI, change in weight, presence of acute disease
Maastricht Index <sup>51</sup>	Percentage ideal body weight, albumin, prealbumin, lymphocyte count
Nutrition Risk Classification <sup>52</sup>	Weight loss, percentage ideal body weight, dietary intake
Nutritional Risk Index <sup>53</sup>	Present and usual body weight, albumin
Nutrition Risk Screening 2002 <sup>54</sup>	Weight loss, BMI, foot intake, diagnosis severity
Prognostic inflammatory and Nutritional Index <sup>55</sup>	Albumin, prealbumin, C-reactive protein, $\alpha$ 1-acid, C-reactive protein, $\alpha$ 1-acid glycoprotein
Prognostic Nutritional Index <sup>56</sup>	Triceps skin fold, albumin, transferrin, skin sensitivity
Simple Screening Tool <sup>57</sup>	BMI, percentage weight loss
Short nutrition assessment questionnaire <sup>58</sup>	Recent weight history, appetite, albumin
	Recent weight, height, mid-arm circumference, diet history, appetite, feeding mode use of oral supplement or tube feeding
<b>Nutrition assessment tools</b>	
Mini Nutritional Assessment <sup>59</sup>	Weight information, height, mid-arm circumference, calf circumference, diet history, appetite, feeding mode, albumin, prealbumin, cholesterol, lymphocyte count
Subjective Global Assessment <sup>18</sup>	Weight history, diet history, primary diagnosis, stress level

BMI = Body mass index.

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