



Brief communication

Malnutrition in hospitalized Asian seniors: An issue that calls for action

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ABSTRACT

In Asia, the proportion of older people (i.e., > 65 years) in the population is already high and will continue to grow in the 21st century. Malnutrition, particularly undernutrition, is a common and costly problem among older people in communities and in hospitals. People with acute and chronic conditions are at a high risk of malnutrition. In our paper, we review the tools that are used to screen for malnutrition risk and to ascertain malnutrition. We call on health care professionals in Asia to take action against malnutrition in older people. Increased attention to nutritional care is essential to improving the wellbeing of older people and containing health care costs.

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1. Introduction

The world's population is aging. The percentage of people who are aged 60 years or older increased globally from 9.2% in 1990 to 11.7% in 2013, and will reach 21.1% of the population by 2050. These figures affect Asia more than any other continent: three of the four countries with the most people aged ≥ 80 years are Asian. More than 60% of persons aged ≥ 80 years—144 million people—live in Asia (United Nations, Department of Economic and Social Affairs, Population Division (2013). World Population Ageing 2013. ST/ESA/SER.A/348).¹ It is therefore imperative that Asia prepares for the major issues that an aged society will face. Among such issues is the widespread prevalence of malnutrition in the elderly. Studies of hospitalized patients worldwide have reported that the prevalence of malnutrition (i.e., undernutrition) and nutritional risk affect up to 50% of individuals.^{2–8} Such pervasiveness is particularly evident among seniors and individuals with comorbid conditions that are associated with nutritional intake. Aging is frequently accompanied

by decreased taste acuity and smell, deteriorating dental health, and a decline in physical activity because of lifestyle or disability, all of which may affect nutrient intake⁹ and lead to undernourishment and its potentially serious consequences. However, undernutrition is not an inevitable consequence of aging. This article aims to raise clinicians' awareness of the prevalence of malnutrition in hospitalized seniors. With inadequate strategic planning and actions, this preventable problem is gradually becoming a significant health care issue and a future economic burden.

Some countries are beginning to take actions that will help improve the health status of older people. In an Urban Aging Forum, Chen et al¹⁰ discussed initiating programs for long-term care insurance (LTCI). Germany and Japan initiated LTCI programs when the elderly population rates reached 17–18%, whereas Korea introduced a LTCI program when its elderly population was just 10%.¹⁰ Korean health care leaders recognized that the care of older people consumed up to 30% of its public health resources, and that its senior population (i.e., people aged ≥ 60 years) was continuing to grow.¹⁰

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2. Study results reviewed

2.1. Malnutrition and undernutrition: synonyms in hospital settings

Malnutrition (i.e., undernutrition) is a widespread condition that impacts millions of people across the world annually. Adult undernutrition typically occurs along a continuum of inadequate intake and/or increased nutritional requirements, impaired absorption, altered transport, and altered nutrient utilization. Weight loss can, and frequently does, occur at multiple points along this continuum. According to the definition by the British Association of Parenteral and Enteral Nutrition, malnutrition is a state of nutrition in which a deficiency or excess (i.e., imbalance) of energy, protein, and other nutrients causes measurable adverse effects on tissue/body form (i.e., body shape, size and composition, function, and clinical outcome).¹¹ Although the term malnutrition refers to over-nutrition/obesity too, our discussion focuses on undernutrition.

In late 2009, the Academy of Nutrition and Dietetics (AND; Chicago, IL, USA) appointed a workgroup that included representation from the American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.; Silver Spring, MD, USA) to identify and standardize the markers and characteristics of nutritional status that are distinct from the inflammatory response associated with various diseases and conditions.¹² No single parameter is definitive as undernutrition for adult malnutrition. The identification of two or more of the following six characteristics is recommended for diagnosis: (1) insufficient energy intake,^{13–15} (2) weight loss,^{6–19} (3) loss of muscle mass,^{19,20} (4) loss of subcutaneous fat,^{19,20} (5) localized or generalized fluid accumulation that may mask weight loss,^{19,20} and (6) diminished functional status as measured by handgrip strength.^{19,21–26} The Consensus Statement of the Academy of Nutrition and Dietetics and American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) suggested that the term “adult malnutrition” should be synonymous with “adult undernutrition.”¹²

2.2. Prevalence of malnutrition in Asian hospitals

Malnutrition as undernutrition is common among hospitalized patients, even in well-developed countries such as the United States, and its coded prevalence is increasing.²⁷ The prevalence varies, depending on several factors such as a patient's diagnoses, age, nutrition parameters, and the screening and assessment tools used. **Table 1** shows the prevalence of malnutrition in hospitalized seniors in Asia, according to country and setting, from data collected from studies conducted from 2005 to 2012.^{43–51}

Our review of the studies conducted in Asia from 2005 to 2012 demonstrated that the prevalence of malnutrition (which includes the risk of malnutrition) among hospitalized seniors ranged from 16% to 78%. This range is consistent with the prevalence of malnutrition that has been documented in the United Kingdom (UK). For example, one study in the UK found that 29–61% of hospitalized older people had malnutrition,²⁸ and another study places the figure at 58%.²⁹ This wide range can be attributed to differences in the criteria used to identify malnutrition or its risk. However, it is clear that malnutrition is common in hospitalized elderly patients.

2.3. Nutrition screening and assessment tools

Screening tools such as the Malnutrition Screening Tool (MST), the Malnutrition Universal Screening Tool (MUST), and the Nutrition Risk Screening (NRS 2002) tool can quickly flag high-risk patients for further assessment. Thorough assessments can be completed efficiently by using tools such as the Subjective Global Assessment (SGA). The results can help personnel design appropriate nutrition intervention plans. Assessment tools such as the SGA provide a more complete picture of nutritional status beyond biochemical or anthropometric markers alone, both of which can be affected by factors other than nutrition. **Table 2** provides a brief description of commonly used validated tools.^{52–60}

Table 1
Prevalence of malnutrition in Asian countries.

Country	Study	Study population	Subjects (no.)	Health care setting	Prevalence of malnutrition &/or at risk of malnutrition (%)	Method & details of patients with reported malnutrition & patients at risk of malnutrition
China	Lei et al 2009 ⁴³	>60 y	184	Hospital	72.8	MNA: at risk, 53.2%; malnourished, 19.6% Malnutrition: BMI <18.5 & albumin level <35 g/L Chinese Nutrition Screening (CNS): at risk, 25.8%; undernourished, 10.1% SGA • Total patient group: moderate, 28.8%; severe, 26.9% • Major surgery group: moderate, 35.4%; severe, 42.3% • BMI: undernourished, <18.5 kg/m ² • IBW: undernourished, <85% SGA: moderate, 25%; severe, 4%
	Shum et al 2005	≥60 y	120	Convalescent & rehabilitation hospital	16.7	
	Woo et al 2005 ⁴⁵	≥65 y	867	Hospitals & nursing homes	35.9	
Vietnam	Pham et al 2006 ⁴⁶	Surgical patients, age not specified	438	Hospital admission	55.7	77.7
India	Karmakar et al 2010 ⁴⁷	>60 y	76	Hospital	27.6	
Singapore	Lim et al 2011 ⁴⁸	Adults, 18–74 y	818	Acute tertiary hospital (i.e., within 48 hours of admission)	42.1	29
Korea	Chung & Sohn 2005 ⁴⁹	Hospitalized geriatric patients, ≥65 y	108	Hospital	63	
Malaysia	Sakinah & Tan 2012 ⁵⁰	Medical & oncology elderly patients, ≥65 y	100	Hospital	21	MNA Malnutrition: 22.3% At risk: 40.7% Malnutrition Risk Screening Tool–Hospital (MRST-H; structured questionnaire), followed by anthropometry measurements. A total score ≥5 indicates “at high risk of malnutrition” Identified as underweight by BMI: • 34.8% of 23 patients in the Radiotherapy Unit • 37.1% of 13 patients in the Gastrointestinal Surgery Unit
Indonesia	Sutanto 2011 ⁵¹	Radiation therapy & gastrointestinal surgery patients	36	Hospital	34.8–37.1	

BMI = body mass index; IBW = ideal body weight; MNA = Mini Nutrition Assessment; SGA = Subjective Global Assessment.

2.4. Managing hospital malnutrition leads to positive outcomes

Nutrition screening and assessment can result in appropriate nutrition intervention, which can improve outcomes for patients and hospitals. One hospital developed a comprehensive program integrated in the care plan of all patients and in the discharge planning process. Outcome studies have demonstrated the effect of the malnutrition treatment program on patient recovery and cost of care.³⁰ Reilly showed that a 3- to 5-day delay in identifying malnutrition has a direct variable cost of \$1,500 per case.³¹ The rates of complication and mortality were also significantly reduced.³¹ Milne et al³² reviewed 62 randomized and quasi-randomized controlled trials of oral protein and energy supplementation in older people, excluding patients recovering from cancer treatment or in critical care. They concluded that among 10,187 randomized participants, supplementation produced a small but consistent weight increase in older people, and mortality may have been reduced in the older people who were undernourished.

Oral supplementation or “sip feeds” are usually provided first to individuals with functional gastrointestinal tracts to promote gastrointestinal functionality and integrity. The “sip feeds” are also

cost effective. Stratton et al³³ completed a meta-analysis of five randomized, controlled trials of 1224 older adult patients; their results showed that oral nutritional supplementation can significantly reduce the risk of developing pressure ulcers by 25% in this population. The authors reviewed > 80 studies on the use of oral nutritional supplements by people with chronic conditions. They found that supplementation typically had a positive effect on functioning (e.g., improved muscle strength, walking distance, and wellbeing) in patients with chronic obstructive pulmonary disease. Additional findings by Stratton and Elia³⁴ suggested reduction in falls and increased ability to perform activities of daily living in older adults. Beattie et al³⁵ followed 101 hospitalized patients who received oral nutritional supplementation after surgery for 10 weeks instead of the standard postoperative care; they found that the nutritional status and quality of life measures significantly improved in the treatment group.

Growing evidence suggests that nutritional intervention, especially with oral nutritional supplements, leads to faster recovery, fewer complications, and lower overall health care costs.³⁶ A prospective observational study conducted from 2011 to 2013 by Guerra et al³⁷ demonstrated that undernourished patients who

Table 2
Common nutritional screening/assessment tools.

	Tool	Features of the tool	Result expressions (i.e., score, degree, or rating)
Screening	MST ⁵²	<ul style="list-style-type: none"> • Simple, quick, valid, & reliable. • Only 2 questions related to weight loss & decreased appetite. 	A score of ≥ 2 suggests the need for further assessment.
	SNAQ ⁵³	<ul style="list-style-type: none"> • An easy, short, valid, & reproducible questionnaire for the early detection of hospital malnutrition • Scores patients by 3 questions related to unintentional weight loss within the past 1–6 mo, decreased appetite within the past 1 mo, & use of nutritional supplements or tube feeding within the past 1 mo. 	Well-nourished: score of 0–1 point Moderately malnourished: score of 2 points & nutritional intervention. Severely malnourished: score of 3 points, nutritional intervention, & treatment by a dietitian.
	MUST ^{53,54}	<ul style="list-style-type: none"> • A tool for screening adult patients. • The clinician determines BMI, the % of unintended weight loss over the past 6 mo, & estimates the effect of illness on nutrition intake. 	A score of 1 indicates “medium risk” & a score of ≥ 2 indicates “high risk.” Based on the score, the clinician develops a patient care plan.
	MRST-H ⁵⁵	<ul style="list-style-type: none"> • Tool developed in Malaysia to screen for malnutrition risk in older patients in hospitals. • Responses are scored on a structured questionnaire (e.g., physical function, self-feeding, unintentional weight loss), & anthropometric measures. 	A score of ≥ 5 indicates “high risk” of malnutrition.
	NRS 2002 ^{56,a}	<ul style="list-style-type: none"> • Recommended by the ESPEN for nutritional screenings; identifies risk in patients who are severely ill with: <ul style="list-style-type: none"> ■ Increased nutritional requirements ■ Severely undernourishment ■ Certain degrees of disease severity combined with degrees of undernutrition. 	The degree of disease severity & undernutrition is defined as “absent,” “mild,” “moderate” or “severe,” & assigned a numeric score.
Assessment	SGA ⁵⁷	<ul style="list-style-type: none"> • A validated tool that includes a medical history & a physical examination. <ul style="list-style-type: none"> ■ Changes in weight, dietary intake, gastrointestinal symptoms that persist > 2 wks & functional capacity. ■ The physical exam includes an evaluation of subcutaneous fat, muscle wasting, ankle & sacral edema, & ascites. 	<ul style="list-style-type: none"> • Patients are assigned a nutrition rating of SGA-A (i.e., “well-nourished”), SGA-B (i.e., “moderate or suspected undernourished”), or SGA-C (i.e., “severely undernourished”). • Some clinicians now use a 7-point scale instead of the original 3-point scale. • Key indicators of undernutrition are <ul style="list-style-type: none"> ■ Weight loss >5% within the past 3 mo or ■ Weight loss >10% within the past 6 mo. Once complete, the patients are categorized into one of three levels: “satisfactory,” “risk of malnutrition,” or “protein energy malnutrition.”
	MNA ^{58,59,a}	Designed for use with older patients & includes <ul style="list-style-type: none"> ■ Anthropometric measurements (e.g., calf & arm circumferences, BMI, & weight loss). ■ Lifestyle, mobility, & medication usage are assessed. ■ Dietary questionnaire to measure food & fluid intake & autonomy of feeding. The clinician has to subjectively assess the perception of the health & nutrition status by the patient.	
	NRI ⁶⁰	An index derived from serum albumin (ALB) level & the ratio of actual to usual weight $\text{NRI} = (1.519) \text{ALB (g/L)} + (41.7) (\text{present weight/usual weight})$	Scores fall into 1 of 4 categories: Not malnourished, >100; Mildly malnourished, from 97.5 to ≤ 100 ; Moderately malnourished, from 83.5 to <97.5; Severely malnourished, <83.5.

BMI = body mass index; ESPEN = European Society for Clinical Nutrition and Metabolism; MNA = Mini Nutrition Assessment; MRST-H = Malaysian Malnutrition Risk Screening Tool-Hospital; MST = Malnutrition Screening Tool; MUST = Malnutrition Universal Screening Tool; NRI = Nutrition Risk Index; NRS 2002 = Nutrition Risk Screening; SGA = Subjective Global Assessment; SNAQ = The Short Nutritional Assessment Questionnaire.

^a The NRS 2002 and short-form MNA can be used for screening and assessment.

were evaluated by the Academy of Nutrition and Dietetics–American Society for Parenteral and Enteral Nutrition Recommended Clinical Characteristics of Malnutrition (AA-CCM) and the Patient-Generated Subjective Global Assessment (PG-SGA), or patients whose nutritional risk was identified by the criteria of the NRS-2002 and MUST questionnaire (with low quartiles by sex and phase angle and with low handgrip strength at hospital admission) had a lower probability of being discharged from the hospital.

Many studies have found a direct relationship between malnutrition and length of stay, treatment costs, delay in the return to usual life, and hospital readmission rates.^{36–39} In addition, oral nutrition supplements are associated with decreased use of health care resources. The results of a recent, large health economic study demonstrated that providing oral nutrition supplements during hospitalization was associated with a 21.6% reduction in hospitalization costs, 21% decrease in length of hospital stay, and 6.7% decline in the probability of 30-day readmission.⁴⁰ Providing nutritional support to patients at risk of developing malnutrition and to patients who already have altered nutrition, may decrease morbidity and mortality; improve quality of life and/or functioning; and decrease the length of hospital stay, use of resources, and care costs.

3. Discussion

3.1. A vast amount of research reveals a high prevalence of malnutrition in hospitals

Research also indicates that nutritional intervention during hospitalization is associated with saving health care resources.⁴⁰ Health care professionals have been aware of this and are exploring workable strategies to reduce the economic costs of undernutrition.

3.2. The key to effective treatment is to identify the high-risk patients as early as possible

Previous publications have suggested that 21–54% of patients are at risk of undernutrition, depending on the assessment instrument used and the patient population. Necessary steps for preventing undernourishment are screening patients for malnutrition soon after hospital admission and assessing patients identified as at risk, intervening with appropriate nutritional support for patients who can benefit, and monitoring their progress to make appropriate changes to the nutritional intervention.⁴¹

3.3. There is an urgent need to identify one simple validated tool that can be commonly used in Asia

In a recent comparison of nutrition screening tools, the MST questionnaire was identified as valid and reliable for recognizing undernutrition.⁴² The MST questionnaire uses only two questions—one about unintentional weight loss and the other about appetite. The simplicity of the MST questionnaire makes it easy to train health care providers on how to use it, which may overcome their resistance to implementing it. As recommended by Correia et al,³⁶ the MST questions can be paired with clinical judgment about the patient's malnutrition risk because of his or her disease condition.

We recommend the MST questionnaire to screen all Asian seniors for the risk of undernutrition at the time of hospital admission. For individuals identified as at risk, we advise a full nutrition assessment using a tool such as the Mini Nutrition Assessment or SGA, and then a referral to a hospital nutrition professional for an individualized care plan, based on local management guidelines

and policies. For the best health outcomes among hospitalized seniors, we emphasize the importance of prompt nutritional intervention, (e.g., oral nutrition supplements), as soon as the risk is detected. In addition to improved health outcomes, evidence shows that nutrition intervention also reduces the care costs in this population.^{36–39} Proactive planning and proper execution of nutritional support will help save overall health care expenditures.

Conflicts of interest

The authors have no conflicts of interest relevant to this article.

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