

Review Article

Tackling undernutrition in the Asian healthcare setting: a Southeast Asian expert consensus

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Background and Objectives: Malnutrition is under-recognized and under-treated in Asia due to resource constraints, lack of awareness and knowledge among healthcare professionals and patients, and lack of standardized procedures for malnutrition management. While international guidelines for the management of malnutrition are available, they may not be easily applicable to the patient population and healthcare settings within Southeast Asia. This paper provides consensus recommendations, developed by the Regional Nutrition Working Group, to foster evidence-based nutritional care in Southeast Asia to improve patient outcomes. **Methods and Study Design:** The group convened and discussed evidence-based recommendations and clinical experiences in the management of malnutrition in hospitalized and community-dwelling adults, and the relevance of oral nutritional supplements in clinical practice. Supported by a literature search from January 2007–September 2017, consensus statements on key aspects of malnutrition management were developed. **Results:** Malnutrition management should be considered as an integral part of patient care and managed by a multidisciplinary team. Hospitalized patients and outpatients should be screened for risk of malnutrition with validated tools. Nutrition intervention, including oral, enteral, or parenteral nutrition, should be accessible and individualized to all patients who are malnourished or at risk of malnutrition. Education on nutrition care is imperative for healthcare professionals, patients and caregivers. **Conclusion:** These consensus recommendations provide practical guidance to improve nutrition practice within healthcare in Southeast Asia. With collaborative efforts from the clinical community, professional societies and policy makers, this regional effort may also facilitate change in the nutrition practice at the institutional and national level.

Key Words: undernutrition, Southeast Asia, consensus, ONS, nutrition care

INTRODUCTION

Malnutrition may be 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”,¹ and is synonymous with undernutrition.^{2,3}

Malnutrition, estimated to affect 30–50% of hospital-

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ized adults, is associated with loss of muscle mass, impaired immunity, decreased wound healing, increased complications and morbidity, frequent hospitalizations and longer length of stay, decreased quality of life (QoL), increased mortality, and higher healthcare costs in community-dwelling and hospitalized patients.⁴⁻¹¹ Additionally, patients who are malnourished or at risk of malnutrition often experience further deterioration in their nutritional status during hospitalization as their increased metabolic needs are not sustained by the reduced nutrient intake during hospitalization.^{12,13} Malnutrition and hospitalization-associated loss of muscle mass may be particularly debilitating in the elderly who often have insufficient protein intake and are at an increased risk of sarcopenia, resulting in an increased risk of falling and impairment in performing routine daily activities.¹⁴⁻¹⁹

Studies from Asia have revealed a high prevalence of malnutrition across different patient populations in hospital and community settings.^{8,20-28} Notably, malnutrition has been reported in up to 78% of hospitalized elderly Asian patients and has been associated with frailty in community-dwelling older adults in Southeast Asia.^{29,30} Furthermore, the preponderance of micronutrient deficiencies among patients in Southeast Asia has been well-documented.^{31,32}

Despite its prevalence, malnutrition is under-recognized and under-treated globally.^{11,20,24,33,34} In Asia, approximately 9–20% of patients experience a deterioration in their nutritional status during and following hospitalization.³⁵⁻³⁷ Inappropriate use of parenteral nutrition in many Asian hospitals has been associated with complications and increased costs.^{21,24,35,38,39} Other common challenges in the management of malnutrition in Asia include resource constraints (lack of trained personnel, facilities, outpatient support, financial support and product availability); lack of nutritional awareness and gaps in nutrition knowledge among healthcare professionals (HCPs) and patients; dearth of standardized procedures for detecting and treating malnutrition; absence of a formal multidisciplinary nutritional support team; lack of timely, and individualized nutritional interventions; paucity of nutritional therapy and follow-up/monitoring plans during and post-hospitalization; and ambivalence towards nutrition support.^{8,20,21,36,40}

While guideline recommendations aim to facilitate diagnosis and management of malnutrition, these may not be optimally implemented in clinical practice.^{41,42} Additionally, international guidelines are developed in Western countries and may not be easily applied to the patient population and healthcare settings within Southeast Asia. Therefore, this manuscript provides consensus recommendations that aim to foster optimal delivery of evidence-based nutritional care considering the socioeconomic and cultural attributes of this region to ultimately improve patient outcomes. This manuscript also serves as a practical guide for the use of oral nutritional supplements (ONS) in patients in Southeast Asia; the scope of this paper will be limited to enteral nutrition, and will not include discussion on parenteral nutrition.

METHODS

The Regional Nutrition Working Group (RNWG) is a

multidisciplinary consortium of 10 experts across specialties including geriatrics, gastroenterology, dietetics, surgery and critical care from Indonesia, Malaysia, the Philippines, Singapore, Thailand, the United Kingdom, and Vietnam (Supplementary figure). We convened at a face-to-face meeting in Singapore in mid-August 2017; an international expert in geriatrics from Taiwan was invited to guide the meeting. A pre-meeting survey of the members provided insights into current practices and challenges in nutrition management in Southeast Asia, which were further discussed during the meeting. The pre-meeting survey results and discussion are henceforth referred to as ‘RNWG input’ in this manuscript.

At the meeting, the RNWG deliberated on published evidence-based recommendations as well as their own clinical experiences to address nutritional concerns in hospitalized and community-dwelling adults and to determine the relevance of ONS in clinical practice. We subsequently devised consensus statements on several topics in clinical nutrition, including the importance of nutrition care; the identification and evaluation of malnutrition; nutrition intervention; and ONS as nutrition therapy. These consensus recommendations are suggested for adult patients with malnutrition, including those with disease-related malnutrition (DRM) in the Southeast Asia region. As part of this effort, we further discussed approaches that may support effective translation of these consensus recommendations into clinical practice. The views of the RNWG do not represent the opinion of any national or international societies.

The RNWG reviewed the literature on nutrition management in Southeast Asia through the PubMed database. Articles published in English from January 2007–September 2017 were identified using the following search terms, including MeSH terms: nutrition, nutritional status, nutritional sciences, malnutrition, undernutrition, under-nutrition, nutrition disorders, Southeastern Asia, ASEAN. As this manuscript is focused on undernutrition in adults, studies that focused on obesity, starvation-related malnutrition, maternal nutrition, or pediatric nutrition were excluded.

RESULTS

Table 1 lists the consensus statements that were developed by the RNWG. Individual statements, including regional evidence and input from the RNWG, are discussed below. In general, there is a dearth of literature on nutrition management in Southeast Asia; therefore, there is a need for more high-quality data from large studies in this region. In the absence of literature from Southeast Asia, our recommendations are supported by evidence from the general literature.

DISCUSSION

Consensus statements

Importance of nutrition care

Statement 1-Malnutrition (undernutrition) must be addressed as it affects clinical, functional and economic outcomes.

Malnutrition is associated with clinical complications such as pressure ulcers and infection; functional impairments including impaired gastrointestinal, pulmonary,

Table 1. Summary of consensus recommendations for addressing malnutrition. Available evidence from Southeast Asia (SEA) region is listed.

	Recommendation	Evidence from Southeast Asia
1	Malnutrition (undernutrition) must be addressed as it affects clinical, functional and economic outcomes.	Wei K et al (2017); Man RE et al (2017); Young LS et al (2016); Chittawatanarat K, Chaiwat O et al (2016); Hoque ME et al (2016); Hanna KL et al (2016); Huong PT et al (2014); Menon K et al (2014); Setiati S et al (2013); Dominguez RJ (2013); Lim SL et al (2012); Chan M et al (2010); Sutipornpalangkul W et al (2007); Yap KB et al (2007)
2	Physicians must consider nutrition intervention as an integral part of patient care. A multidisciplinary team involving physicians, dietitians/nutritionists, nurses and other relevant healthcare professionals is essential for the management of malnutrition.	Budiningsari D et al (2017); Chittawatanarat K, Tosanguan K et al (2016); Karim SA et al (2015); Huong PT et al (2014); Lim SL et al (2014); Menon K et al (2014); Setiati S et al (2013); Komindr S et al (2013); Lim SL et al (2012); Chen X et al (2012); Sakinah H et al (2012)
3	It is imperative for medical undergraduates to receive comprehensive education in clinical nutrition. Continuing education on nutrition for all physicians is crucial to empower them to identify and treat patients who are malnourished or at risk of malnutrition.	Pham QT et al (2017); Budiningsari D et al (2017); Karim SA et al (2015); Lim SL et al (2014); Lim SL et al (2012); Lim SL et al (2009)
4	All hospitalized patients should be screened for risk of malnutrition within 24 hours of admission to identify those who need nutritional assessment and intervention.	Karim SA et al (2015); Lim SL et al (2014); Chen X et al (2012); Lim SL et al (2012); Lim SL et al (2009)
5	All outpatients should be screened for risk of malnutrition at their first clinic appointment to identify patients requiring nutritional assessment and intervention.	Menon K et al (2014)
6	Screening should be performed using an appropriate validated tool. Subjective indicators can also be used to form a clinical impression of an individual's overall nutritional risk.	Budiningsari D et al (2017); Chittawatanarat K, Tosanguan K et al (2016); Chittawatanarat K, Chaiwat O et al (2016); Lim SL et al (2014); Komindr S et al (2013); Chen X et al (2012); Sakinah H et al (2012); Lim SL et al (2012); Chan M et al (2010); Lim SL et al (2009); Yap KB et al (2007)
7	Individuals identified as being at risk should undergo nutritional assessment to determine a specific treatment plan.	Chittawatanarat K, Tosanguan K et al (2016); Karim SA et al (2015); Dominguez RJ (2013); Chen X et al (2012); Lim SL et al (2012)
8	For inpatients, a repeat nutrition screening should be completed before discharge to assess if risk has changed during hospital stay and needs to be addressed in the discharge plan.	Dominguez RJ (2013)
9	All individuals who are at risk of malnutrition should have access to immediate nutrition intervention.	Menon K et al (2014); Dominguez RJ (2013)
10	Physicians or other HCPs should consider using oral, enteral or parenteral nutrition support, alone or in combination, for patients who are malnourished or at risk of malnutrition. Oral nutrition support through diet fortification and/or the use of ONS should be the first line of treatment, unless contraindicated. Nutrition intervention should be provided within the first 24–48 hours of contact.	Chittawatanarat K, Tosanguan K et al (2016)
11	Nutrition intervention should be individualized based on the patient's requirements. Physicians and other HCPs should work with patients to set specific and realistic therapy goals.	Young LS et al (2016); Menon K et al (2014)
12	Monitoring nutritional status in patients with or at risk of malnutrition at regular intervals is essential to optimize nutrition care.	Menon K et al (2014); Lim SL et al (2014)
13	Patients and caregivers need to be educated on the importance of nutrition and adherence to the prescribed intervention.	Menon K et al (2014); Setiati S et al (2013)
14	ONS can be used within the hospital and community health settings for individuals who are unable to meet their nutritional requirements through diet alone.	SEA data not available; global evidence supports this recommendation
15	The clinical and functional benefits, as well as cost-effectiveness of ONS are well established.	SEA data not available; global evidence supports this recommendation
16	ONS should be selected based on the individual's needs in the hospital and community setting.	SEA data not available; global evidence supports this recommendation
17	It is important to optimize compliance to ONS therapy as the efficacy of ONS may be limited if compliance is poor.	SEA data not available; global evidence supports this recommendation

renal, immune, and mental functions; delayed recovery from illness/injury; muscle loss and weakness; poor QoL, and an increased risk of mortality.^{8,10,27,43-45}

A study in Singapore demonstrated that malnourished patients experience longer hospital stays, higher risk of readmission and increased hospitalization costs,⁸ thus posing a significant burden on the healthcare system. The economic burden of DRM has been well-documented worldwide as well as in Asia.^{6,7,10,46,47} Therefore, failing to address the risk of malnutrition may place additional pressure on the already constrained healthcare resources in Southeast Asia, highlighting the importance of fostering a culture that values nutrition. Furthermore, each institution should ideally create a standardized nutrition protocol taking resource availability, cultural factors and local constraints into consideration to optimize nutrition care.

Statement 2-Physicians must consider nutrition intervention as an integral part of patient care. A multidisciplinary team involving physicians, dietitians/nutritionists, nurses and other relevant healthcare professionals is essential for the management of malnutrition.

Nutritional status and nutrition interventions should be considered fundamental components of medical therapy, with nutrition care plans being implemented with the same consistency and priority as other medical therapies. This is particularly important in the context of the high burden of chronic disease in the growing elderly population in Asia. To support this endeavor, guidelines recommend the multidisciplinary delivery of nutrition care through a nutrition support team involving physicians, dietitians or nutritionists, nurses and other healthcare personnel.^{3,48-50}

However, there is a lack of multidisciplinary management of malnutrition, which is often managed in isolation and considered to be the responsibility of dietitians.^{12,51} Physicians usually spend a small amount of time on nutrition support activities.⁵¹ In addition, nurses, who can observe nutritional intake and interact closely with patients and caregivers, are not routinely included in nutrition care and may lack the autonomy to implement nutrition care plans.⁵¹⁻⁵³ In Southeast Asia, coordination among multiple specialties may be lacking due to an under-recognition of the multidisciplinary nature of nutrition care [RNWG input].

Multidisciplinary approach towards nutrition management has been shown to improve outcomes in Asia,⁵⁴⁻⁵⁶ and we recommend that this model be adopted more widely in the region.

Statement 3-It is imperative for medical undergraduates to receive comprehensive education in clinical nutrition. Continuing education on nutrition for all physicians is crucial to empower them to identify and treat patients who are malnourished or at risk of malnutrition.

Deficiencies in nutrition education for medical students and HCPs have been well-described in the literature.^{12,57-60} While some nutrition education seems to be available for medical students in most of Southeast Asia, the breadth and duration (2–16 hours) of this education may be inadequate to meet patient needs in clinical prac-

tice.^{40,61,62} Providing adequate nutrition training during early medical education will instil the importance of nutrition care in overall patient management. Globally and in Asia, curricular heterogeneity in dietetics programs, insufficient practical experience, dearth of specializations at graduate level, varying length of required post-education professional practice, and inadequate provision of CME, lead to competency gaps among dietitians.^{63,64} HCPs are aware of their limited knowledge and confidence in providing nutrition care, and are open to nutrition-related educational activities.⁶⁵⁻⁶⁷

Therefore, there is a need to provide education and training in clinical nutrition to HCPs to facilitate evidence-based nutrition management across the continuum of care.⁶⁸ In order to bridge knowledge gaps in clinical nutrition among HCPs, educational efforts in the region should focus on [RNWG input]:

- a. Integrating early nutrition education as part of the core curriculum of medical students and as part of their specialty training during the residency and fellowships programs across various disciplines
- b. Providing medical students with clinical exposure or hands-on tutorials, conducted by a multidisciplinary team demonstrating nutrition care in patients, in addition to lectures, seminars and conferences/symposiums
- c. Targeting HCPs with regular nutrition care CME programs in collaboration with medical professional colleges and local/international societies. Online tools can serve as an efficient and cost-effective means of providing CME to a diverse group of learners; however, electronic CME should be used to complement rather than supplant traditional CME modalities.⁶⁹

Detecting malnutrition

Statement 4-All hospitalized patients should be screened for risk of malnutrition within 24 hours of admission to identify those who need nutritional assessment and intervention.

Nutrition screening is a rapid process to identify patients who are at risk of nutritional deficiencies. While we have delineated the consequences of malnutrition, it is important to emphasize that being *at risk* of malnutrition is also related to increased morbidity and mortality.³

To facilitate timely identification of malnutrition risk, several guidelines recommend nutrition screening to be completed within 24–48 hours of hospital admission.^{3,70-72} Considering the differential healthcare systems in Southeast Asia, we recommend that nutrition screening be carried out by HCPs with the appropriate skills and training; this is particularly essential as lack of training and education can be major barriers to appropriate screening.^{40,73,74} Quality improvement programs targeting nutrition screening in Southeast Asia have demonstrated positive results and could serve as models for the region.^{53,73}

Patients who are identified as being at risk of malnutrition must undergo further nutritional assessment (statement 7). As nutritional status may deteriorate during hospitalization, we recommend that screening be repeated in patients with prolonged hospital stays (statement 8).

Statement 5-All outpatients should be screened for risk of malnutrition at their first clinical appointment to identify patients requiring nutritional assessment and intervention.

The prevalence of malnutrition or risk of malnutrition is estimated to be as high as 30% in older community-dwelling populations.²⁰ Malnutrition in the community setting is associated with an increased frequency of primary care doctor visits and hospital admissions.⁷⁴ The National Institute for Health and Care Excellence recommends that all outpatients be screened for malnutrition at their first clinical appointment and re-screened when there is clinical concern.⁵⁰

We recognize that the feasibility of screening all outpatients for malnutrition may be contingent on clinical time constraints, patient load, and resource considerations. In Table 2, we have identified specific patient populations in outpatient settings who may be at greater risk of malnutrition and recommend that screening be prioritized in these groups.⁷⁵⁻⁷⁸

Once the risk of malnutrition is identified, HCPs must undertake a more detailed nutritional assessment and implement nutritional care plans; this is particularly important as most outpatients who are at risk of undernutrition receive no nutritional intervention in Southeast Asia [RNWG input].

Statement 6-Screening should be performed using an appropriate validated tool. Subjective indicators can also be used to form a clinical impression of an individual's overall nutritional risk.

Subjective indicators are significant in the geriatric population, particularly in the very elderly (≥ 80 years of age). In patients with dementia, collaborative interviews with the caregiver may be required to assess subjective indicators such as:^{79,80}

- Physical appearance e.g. thin, wasted muscles.
- Loose fitting clothes and/or jewelry.
- History of decreased food intake, reduced appetite or dysphagia.
- Psychosocial/physical disabilities.
- No nutritional intake or likelihood of no intake for more than 5 days.

There is currently no 'gold standard' for nutrition screening, but the following validated screening tools are frequently used in Southeast Asia: Malnutrition Screening Tool (MST), 'Malnutrition Universal Screening Tool' ('MUST'), Nutrition Risk Screening-2002 (NRS-2002), Short Nutritional Assessment Questionnaire (SNAQ), the

Mini Nutrition Assessment (MNA) and the short-form of MNA (MNA-SF) [RNWG input].²⁹ Screening tools developed in Southeast Asia include the Malaysian Malnutrition Risk Screening Tool-Hospital (older hospitalized patients); the 3-Minute Nutrition Screening tool (acute hospitalized patients), developed based on the patient population in Singapore; and the Bhumibol Nutrition Triage and the Nutrition Alert Form for patients in Thailand.⁸¹⁻⁸⁵

While most validated screening tools evaluate combinations of body mass index (BMI), weight loss, food intake, disease severity, and age, 'MUST'(all settings) and NRS-2002 (hospital) are recommended in the general adult population while the MNA or MNA-SF are specifically for older individuals in all settings.^{3,86} We do not recommend any specific screening tools for Southeast Asia; instead, we suggest the use of any screening tool that is validated for the setting (community or hospital) and target population (elderly, general adults, etc.) to which it is applied. Ideally, and where feasible, we recommend the use of the same screening tool in the inpatient and outpatient settings to maintain congruence and facilitate continuity of care.

As the presence of malnutrition may not be documented appropriately during hospitalization, we recommend that nutritional status is documented in the patient's medical record, communicated to all members of the healthcare team, and linked to an action plan.⁸

Statement 7-Individuals identified as being at risk should undergo nutritional assessment to determine a specific treatment plan.

Nutritional assessment involves the use of more comprehensive tools such as the Subjective Global Assessment (SGA) or the MNA, and encompasses medical, nutritional, and drug histories; physical examination; anthropometric measurements; and laboratory data.^{3,87} To diagnose malnutrition, HCPs can utilize well-defined and comprehensive criteria from the ASPEN.²

Appropriate nutritional assessment is vital as it guides the formulation of specific nutritional care plans for individual patients. While a dietitian/nutritionist should ideally perform the nutritional assessment, resource constraints in some countries in Southeast Asia may necessitate assessment by another HCP, such as a physician or a nurse, who is trained in the procedure.

Table 2. Patients who may be at increased risk of malnutrition in outpatient setting.⁷⁵⁻⁷⁸

<ul style="list-style-type: none"> • Elderly patients • Patients with severe acute illnesses • Patients who have recently been hospitalized due to acute severe medical or surgical illness • Patients with chronic illnesses, such as chronic obstructive pulmonary disease (COPD), cancer, chronic heart failure, liver cirrhosis, chronic pancreatitis, inflammatory bowel disease, chronic renal failure, and neurological disorders (e.g. dementia, stroke, Parkinson's disease) • Patients with dysphagia • Patients with debility – includes frailty, immobility, mental illness, depression, bed-ridden patients • Patients with infection with human immunodeficiency virus • Patients with socioeconomic issues, e.g. social isolation, low-income families • Patients with dietary restrictions due to religious reasons or health beliefs • Patients with oral or dental problems, e.g. mastication problems, poor dental health, oropharyngeal candidiasis.
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Statement 8-For inpatients, a repeat nutrition screening should be completed before discharge to assess if risk has changed during hospital stay and needs to be addressed in the discharge plan.

A significant proportion of patients who are not malnourished at hospitalization may become malnourished during and after hospitalization, particularly in Asia.^{36,37,88} Therefore, guidelines recommend rescreening as part of a continuous effort to monitor the patient's nutritional status.^{50,89,90} In malnourished inpatients who receive nutritional intervention during hospitalization, nutritional assessment should be repeated before discharge to assess the impact of the intervention; re-evaluation of nutritional status is particularly important in patients who have undergone surgery or have been in the hospital for a prolonged period.^{75,78} Nutrition strategies must also be included in the discharge plan to facilitate transition of care from the hospital to community settings.

Nutrition intervention

Statement 9-All individuals who are at risk of malnutrition should have access to immediate nutrition intervention.

Patients with malnutrition and those at risk should be treated with medical nutrition therapy, which is considered a primary therapeutic intervention with clinical value for mitigating adverse patient outcomes and healthcare costs.^{33,47,90-92} Nutritional interventions, which include dietary fortification, ONS, enteral tube feeding, and parenteral nutrition, must be guided by a nutrition care plan.^{3,48} The degree of improvement in patient status as a result of nutritional therapy is contingent on disease severity, baseline nutritional status, feeding regimen (timing, route, feed composition and delivery), and patient compliance.⁹² It is imperative to treat underlying causes of malnutrition, as well as manage the factors that increase the risk of malnutrition, including clinical (nausea, vomiting, dysphagia, disease) and psychosocial problems.

The provision of immediate nutrition support may not be appropriate in hemodynamically unstable patients. Patients who have experienced chronic nutrient deprivation (e.g. those with cancer) may be at risk of refeeding syndrome if feeding is initiated aggressively.⁹³ Therefore, feeding must be initiated slowly in some patients, while adjusting and monitoring electrolyte, mineral and fluid imbalances.

Statement 10-Physicians or other HCPs should consider using oral, enteral or parenteral nutrition support, alone or in combination, for patients who are malnourished or at risk of malnutrition. Oral nutrition support through diet fortification and/or the use of ONS should be the first line of treatment, unless contraindicated. Nutrition intervention should be provided within the first 24–48 hours of contact.

To treat those with malnutrition or at risk of malnutrition, guideline recommendations support timely (within 24–48 h of admission) use of nutritional interventions.^{3,72,75,92} Unless contraindicated, the first-line treatment is oral nutritional support, which includes dietary fortification and the use of ONS. Dietary fortification increases the nutrient density of dietary intake through the addition of

energy-rich foods and has been shown to be effective in older people who are malnourished or at risk of malnutrition.^{89,94} This approach, however, requires caution as fortification may supplement energy and/or protein but not necessarily micronutrients.⁵⁰ Evidence supporting the impact of dietary fortification in improving nutritional status is weak or lacking in some settings.⁹⁵⁻⁹⁷ ONS, which are complete and balanced multi-nutrient feeds containing macronutrients (protein, energy, carbohydrates) and micronutrients (vitamins, minerals, trace elements), are often recommended as the preferred nutrition therapy.^{3,89} Oral nutrition support strategies, including dietary advice, fortified foods and ONS may be used in combination to improve nutritional status.⁵⁰

When oral food and/or supplementation are impractical or ineffective, enteral tube feeding is recommended.^{70,72,75} To ensure nutritional quality and safety of enteral tube feeding, we recommend standardizing the process used to prepare blenderized feeds, which constitute a mixture of pureed food and liquids, particularly for hospitalized and critically ill patients; commercial formulations should be considered in patients who can afford them.⁹⁸⁻¹⁰¹ When oral or enteral feeding is insufficient or contraindicated, parenteral nutrition is recommended.^{70,72,75}

Statement 11-Nutrition intervention should be individualized based on the patient's requirements. Physicians and other HCPs should work with patients to set specific and realistic therapy goals.

A nutrition care plan must be tailored to address malnutrition risk, patient needs, clinical conditions, and cultural and religious dietary requirements. The individualized care plan, developed together with patients and their caregivers, can include the following components: nutritional requirements; specific and realistic short- and long-term therapeutic goals; route of administration; expected duration of therapy; monitoring and reassessment parameters; and planning for discharge/at-home care.^{3,48} In addition, the nutrition care plan must be communicated to all members of the healthcare team, and be reformulated if there are changes in the patient's clinical status.

Energy and protein targets in the nutrition care plan must be based on patient age, activity level, nutritional status, clinical conditions, and anticipated duration of nutritional support. Adequate intake of protein is central to limiting age- and illness-related decline in muscle mass, strength, and function.^{14,102} While a minimum of 0.8 g protein/kg body weight/day has been recommended for all men and women 19 years and older,¹⁰³ these recommendations are for healthy individuals and may not be appropriate for those with underlying illnesses or specific disease states. For instance, a minimum of 1.0 g protein/kg body weight/day has been suggested to reduce complications and improve functional outcomes in polymorbid inpatients while a target as high as 2.0 g protein/kg body weight/day has been proposed for critically ill patients with burns or multiple trauma.^{70,104}

Moreover, guidelines have recently recommended increased protein intake in the elderly (>65 years).^{14,15} Healthy older individuals should have an intake of at least 1.0–1.2 g protein/kg body weight/day while 1.2–1.5 g protein/kg body weight/day has been suggested for older

adults who are malnourished or at risk of malnourishment due to acute or chronic illness.^{14,15} However, protein intake may need to be adjusted based on the degree of renal failure in older patients with chronic kidney disease.¹⁵

Statement 12-Monitoring nutritional status in patients with or at risk of malnutrition at regular intervals is essential to optimize nutrition care.

Guidelines recommend that nutritional status should be regularly monitored and re-evaluated in patients at-risk of or with malnutrition.^{50,75,104} Monitoring includes reviewing the nutritional diagnosis, care plan, and the therapeutic goals and outcomes in the context of the patient's clinical condition (weight, strength, physical appearance, appetite and nutritional intake, functional status, laboratory data, and QoL).^{3,48} Patient adherence to nutritional interventions should also be observed so that strategies to improve compliance can be implemented as part of the management plan.

While evidence suggests that food intake may not always be recorded as part of routine practice,^{34,105} documenting patients' progress towards their nutritional goals is vital, as this informs the reformulation of the nutrition care plan to optimize patient outcomes. Furthermore, it is important to evaluate and monitor nutritional status across the continuum of care (hospitalization, transition of care, post-discharge and long-term care). The frequency of these processes will likely be contingent on these verity of illness, degree of malnutrition, and the resources in each country, or institution in this region.

Statement 13-Patients and caregivers need to be educated on the importance of nutrition and adherence to the prescribed intervention.

The nutrition care plan should also include individualized education on nutrition support for patients and caregivers^{12,48}; they do not generally receive adequate nutrition advice from HCPs,^{106,107} with some patients showing poor adherence to nutrition interventions during and post-hospitalization.^{11,12,108,109} In this context, individualized counseling related to interventions has been shown to improve QoL and nutritional parameters.^{110,111}

Topics for education may include the basic understanding of food and nutrition content; importance of nutrition care for wellbeing and recovery; formulation of therapeutic goals for intervention; advice on nutrition recommendations and interventions; type and expected duration of therapy; when and how to take ONS; strategies to optimize adherence; and criteria for treatment discontinuation. As part of transition-of-care and discharge planning, HCPs must coordinate nutrition care with other healthcare facilities (i.e. outpatient, long-term care settings) and counsel and educate patients and caregivers on follow-up and at-home nutritional care.

Oral nutritional supplements

Statement 14-ONS can be used within the hospital and community health settings for individuals who are unable to meet their nutritional requirements through diet alone.

ONS are recommended to supplement dietary intake in individuals who are unable to meet their nutritional requirements through regular food, based on their required energy or recommended dietary allowance, in hospital and community settings.^{3,49,50,75,89,104} ONS are specially formulated to provide energy, macronutrients, and/or micronutrients through complete and balanced ready-to-drink liquids or cream/powder supplements that can be prepared as drinks or be added to drinks or foods. ONS are intended to be provided in addition to the normal diet under medical supervision and should not replace the provision of food or other nutritional care (help with feeding).⁸⁹

To meet differing nutritional needs and requirements, ONS are available in a range of types (high protein, low volume, fiber-containing), styles (milk, juice, yogurt, savory, pre-thickened), and energy densities (1–2.4 kcal/ml).⁸⁹ Furthermore, ONS can be classified into standard and specialized based on the nutritional composition. While standard ONS have a balanced composition of macro- and micronutrients that represent dietary recommendations for healthy individuals, specialized ONS are adapted to contain certain nutrients in higher amounts, and/or reduced levels of other nutrients to meet the needs of patients with specific clinical conditions.³

Statement 15-The clinical and functional benefits, as well as cost-effectiveness of ONS are well established.

Growing evidence suggests that ONS significantly improve functional and clinical outcomes and reduce mortality, clinical complications, risk of falls, and loss of muscle mass.^{112–115} ONS have also been shown to decrease length of hospital stay as well as unplanned hospital readmissions, which is often considered a surrogate marker for high-quality care, in medical and surgical patients.^{114,116–120} In addition, ONS improve patient QoL^{121,122} and are cost-effective in hospital and community settings.^{50,123,124} The guidelines for Integrated Care for Older People recently published by the World Health Organization further highlight the importance of ONS, stating that ONS with dietary advice should be recommended for older people who are malnourished.¹²⁵ Table 3 lists patient groups that are likely to benefit from treatment with ONS; however, this list is not exhaustive and should not be strictly used to identify patients who should be prescribed ONS.

Prescription of ONS should be based on estimated nutritional deficit from calculated requirements of energy and protein, and on whether the nutritional goal is to maintain or increase body weight. For example, a simple

Table 3. Patient groups that are likely to benefit from treatment with ONS.

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- Patients with disease-related malnutrition
 - Surgical patients requiring preoperative and postoperative nutrition support
 - Hospitalized patients with acute severe medical or surgical illness
 - Elderly patients
 - Patients with loss of appetite and/or anorexia
-

weight-based equation, such as multiplying the patient's body weight (kg) by 25–30 kcal, may be used to estimate daily energy needs in the hospital.^{91,92}

Clinical benefits have been observed with 300–900 kcal of ONS per day when patients are treated for 2–3 months, although supplementation may range from a few days to a year.^{114,117} In clinical practice, the dose and duration of ONS use must be individualized to the patient's clinical condition, response to ONS and nutritional needs, and is contingent on clinician judgment. ONS should be continued for as long as the patient remains at risk for malnutrition based on subsequent monitoring of the patient's nutritional status.

We consider that available evidence on ONS duration and dosing from international literature is valid for this region as there is no reason to believe that patients in Southeast Asia would respond any differently to ONS. An ongoing study that examines the effects of ONS and aims to create a reference nutrition database for community-dwelling elderly in Singapore (NCT03245047; <https://clinicaltrials.gov/ct2/show/NCT03245047>) may provide further guidance pertaining to nutritional management of elderly Asian patients.

Statement 16-ONS should be selected based on the individual's needs in the hospital and community setting.

Standard ONS can often meet the needs of most patients. Specific patients may benefit from specialized ONS, such as:

- ONS with higher calories and protein for patients with volume restrictions, cancer, sarcopenia, COPD, or those recovering from some critical illnesses.^{126–130}
- Diabetes-specific ONS containing a higher proportion of monounsaturated fatty acids, fructose, and fiber, for individuals with diabetes and hyperglycemia.¹³¹
- Renal specific-ONS that would be prescribed to patients with chronic kidney disease.¹³²

Statement 17-It is important to optimize compliance to ONS therapy as the efficacy of ONS may be limited if compliance is poor.

Patient compliance to ONS has generally been reported to be good (78%), with some variation across healthcare settings.¹³³ Compliance was positively correlated with ONS with higher energy density (≥ 2 kcal/ml), possibly due to the smaller intake volume as well as greater ONS and total energy intakes, but was unrelated to the amount or duration of ONS therapy. In Southeast Asia, however, there is a dearth of study on compliance to ONS; an insight from an unpublished study among elderly patients admitted at Saint Luke's Medical Center in the Philippines reported low consumption of prescribed ONS [RNWG input].

We outline some practical strategies that may optimize compliance to ONS in Southeast Asia:

- Prescribe standard ONS, which tends to be widely available; energy-dense (smaller volume) ONS can be considered where appropriate – higher energy formulations must be introduced gradually, especially in patients who have not been eating well for some time. Patients should also be encouraged to consume energy-dense ONS slowly^{133,134}

- Establish the taste preferences of the patient by offering varied ONS flavors and types i.e. through a starter pack in community settings
- Monitor compliance and amend ONS prescription, as necessary
- Encourage patients to pair ONS with preferred flavor profiles (e.g. coffee, chocolate), include ONS into everyday recipes (e.g. shakes or smoothies), and/or consume chilled ONS
- Counsel patients that they can take ONS in small doses at intervals throughout the day, instead of consuming the ONS at once
- Improve patient understanding of the importance and appropriate use of ONS through education and communication
 - Advise that ONS are not intended to replace food or meals.
 - Clarify that ONS can be milk-based but clinically lactose free.
 - Emphasize the concept of ONS as medication.¹³⁵

Conclusion

This article serves as the initial step to improve nutrition practices within healthcare settings in Southeast Asia, where several gaps in the identification and management of malnutrition persist. While some countries in the region have developed food-based dietary and nutritional guidelines,^{136,137} there is a dearth of guidance on malnutrition, including DRM, in the hospital and community healthcare settings. In this context, improved care processes and increased awareness of and education related to nutrition are important for overcoming challenges in nutrition care.

Our consensus recommendations are intended to provide a regional perspective on evidence-based nutrition care to facilitate high-quality nutritional practices in the clinical community in Southeast Asia. Furthermore, we provide practical guidance on implementing low-risk and cost-effective nutritional interventions that systematically prevent, identify, and manage malnutrition to improve clinical and economic outcomes.

We recognize that successful implementation of these consensus recommendations into real-world clinical practice requires 1) comprehensive educational efforts of HCPs and healthcare institutions to increase awareness of the role of nutrition on healthcare outcomes and costs, and 2) the collaborative efforts between various stakeholders, including the clinical community, professional societies, and policy makers.

As many physicians find it difficult to gain institutional support for nutrition care, a regional expert consensus may be used to facilitate nutrition-related policies at the institutional level. Therefore, we hope that initiatives at the regional level will foster improved nutrition practices and high-quality care at the country level.

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AUTHOR DISCLOSURES

Dr DHL Ng, Dr STH Chew, Dr NVQ Thu and Dr S Setiati have no conflict of interest to declare. Dr MP Tan has received honoraria from Abbott Nutrition, Kotra Pharma, Merck Sharp and Dohme, Novartis, Lundbeck and Boehringer Ingelheim for continuing medical education lectures on nutrition, pain management and dementia. Dr V Pisprasert has received honoraria as a speaker for Abbott, Thai-Otsuka, Nestle, Baxter and Fresenius Kabi. Dr A Albay has received speaker honoraria from Abbott Nutrition, Nestle Nutrition Institute and Fresenius Kabi. Dr JF Inciong has received honoraria from Abbott Nutrition, Nestle, Otsuka, Baxter, Fresenius Kabi, B Braun, and JW for continuing medical education lectures. C Glencorse and L Claytor are Abbott employees.

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Supplementary figure 1. A regional map illustrating the countries involved in the RNWG, a collaborative effort to improve nutrition practice in the Southeast Asia region.