



# NUTRITION RESOURCE LINE

INTEGRATIVE MEDICINE REPORT®

**Guest Editor:** Michel Sanscartier, RD, MSc

President

Ordre professionnel des diététistes du Québec

Clinical Nutritionist

Institut universitaire de gériatrie de Montréal

Montreal, Quebec

## Systematic Assessment of Malnutrition, a Major Source of Preventable Morbidity and Mortality

Malnutrition is among the most readily reversible sources of adverse outcome among patients with acute or chronic illnesses. Systematic methods of diagnosis and treatment are essential because protein-energy depletion, which undermines recovery to increase risk of morbidity and mortality, often occurs prior to loss of body mass or other physical signs. Available methodologies for identification of the malnourished patient have been associated with clinical benefits. These methodologies, when appropriately applied, not only correlate with reductions in adverse outcomes but also reductions in health care costs, particularly those generated by prolonged hospital stays or length of care. Although treatment of malnutrition may be coordinated by dietitians, physicians and nurses must also increase their sensitivity to the risks of protein-energy depletion to drive a policy of screening and intervention. A lack of commitment to reversing the toll incurred by malnutrition is often the greatest obstacle to effective management.

### Risks of Malnutrition Overlooked

The occurrence of malnutrition is well documented among patients admitted to acute care and chronic care facilities. At the time of admission to an acute care facility, 20% to 28% of patients with chronic illnesses are malnourished.<sup>1,2</sup> Moreover, an even larger proportion is at risk for malnutrition. According to a collection of studies with more than 14,000 hospitalized patients evaluated with the Mini Nutritional Assessment (MNA) tool, 23% had malnutrition and 45% were at risk for malnutrition.<sup>3</sup> Only 32% had normal nutritional status (Figure 1). In another study using a different screening tool, up to 80% of patients in an acute care facility who were waiting for admission to long-term care were malnourished.<sup>4</sup>

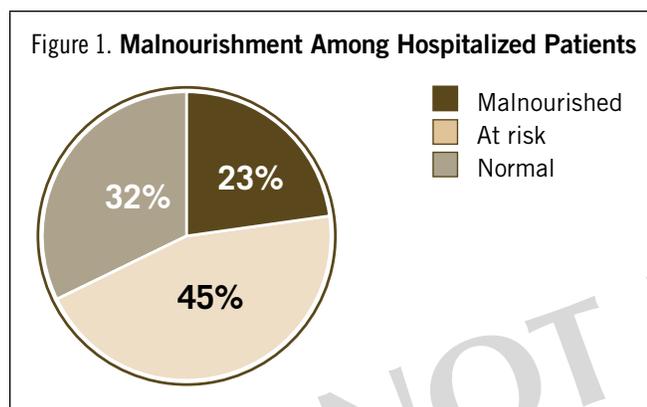
Moreover, the proportion of hospitalized patients with malnutrition rises within selected groups such as the elderly,<sup>5</sup> and the risk of malnourishment increases with hospital stay.<sup>6</sup> Loss of appetite is commonly observed in individuals with acute or chronic diseases, and malnourishment may be exacerbated by a broad array of disease-associated complications such as diarrhea or other dysfunctions of the gastrointestinal (GI)

tract, difficulty swallowing or an accelerated metabolic rate that increases the risk of protein-energy depletion.<sup>7,8</sup>

A timely diagnosis of malnutrition is dependent on nutritional screening. Physical appearance alone is not a sensitive measure. Malnutrition can occur in advance of clinically noticeable weight loss among individuals who have consumed a diet low in nutrients or who have a condition that results in nutrient malabsorption. Moreover, a subjective evaluation of appearance may be misleading for clinicians unable to provide an accurate history of premorbid or recent weight loss. A policy of systematic screening for nutritional status has the potential to increase the likelihood of early detection when malnourishment is most easily treated. Restoring adequate nutritional status should be considered an urgent and fundamental step in the treatment of any illness because of the importance of protein stores to a wide variety of physiological processes that influence recovery, such as immune function and wound healing.<sup>9,10</sup>

The susceptibility to malnutrition intensifies with age at least partly due to progressive loss of energy stores provided by muscle mass. Population-based studies suggest loss of muscle

mass begins at about age 50 even in otherwise healthy individuals, reaching clinically significant levels in 20% of otherwise healthy individuals older than 60 years of age and 50% in those older than 75 years of age.<sup>11</sup> Consequently, the threshold of protein-energy depletion is reached more quickly in older than in younger individuals with a similar degree of weight loss. Baseline frailty, dementia and other age-related conditions may also indirectly lead to malnutrition because of the difficulties they pose for food preparation and the lack of individualized nutrition treatment.<sup>12</sup> However, it is important to recognize that resistance exercises can increase muscle mass significantly in older men, including those up to the age of 96 years.<sup>13,14,15</sup>



Adapted from Gibney et al. UCD Institute of Food and Health Policy Seminar Series. Accessed January 13, 2001. [http://www.ucd.ie/t4cms/ucd\\_ageing\\_policy\\_doc\\_june\\_10.pdf](http://www.ucd.ie/t4cms/ucd_ageing_policy_doc_june_10.pdf)

While it is reasonable to emphasize the importance of early detection and treatment of malnutrition in older patients, who represent a large proportion of hospitalized patients and a growing segment of the population in Canada,<sup>16</sup> poor nutritional status is not limited to this patient population. An institutional policy of screening and monitoring all individuals for nutritional status provides a relatively simple but profound opportunity to improve outcome. Evidence indicates that nutritional status is not well monitored in Canada, where few hospitals employ guideline-mandated strategies.<sup>17</sup> The two most important steps in a nutritional assurance program are summarized as screening for malnutrition within the first 24 to 72 hours of hospital admission and establishing a nutritional care pathway sufficient to monitor for and treat poor nutritional status over prolonged institutional care.

### Evidence for Benefits of Detection

There is no single or uniform definition of malnutrition applicable to all patients because of the diversity in nutrient depletion relevant to specific types of illness. However, there is a range of clinically valid measures of detecting protein-energy depletion. The simplest is to question patients about unintentional weight loss, which is most revealing when it has been progressive over a limited period of time such as the preceding 6 months. More sensitive tools, such as the

Malnutrition Universal Screening Tool (MUST), generate a score that may be useful for stratifying patients by the presence of or relative risk for developing malnutrition. With the MUST method, which has been validated and can be completed quickly, such variables as body mass index (BMI) and disease state are considered in addition to weight loss.<sup>18</sup> Other screening tools are available, but the act of adopting a screening program that draws attention to the problem of malnutrition may be at least as important as the specific screening tool employed. Hospital-based nutritionists are often asked to address hypoalbuminemia as an early sign of malnutrition, but it is important to emphasize that this visceral protein has a half-life of 21 days. It is therefore not a sensitive signal of the nutritional state. Other variables that are part of a baseline nutritional assessment are substantially more sensitive for malnutrition.

There is concern that some institutions have been slow to adopt screening for malnutrition because of a lack of a single standard, but this ignores the evidence that a number of sensitive screening methods exist. In a study that employed 2 different methods for nutritional screening in patients over the age of 65 years in a subacute care facility, both led to interventions that provided highly significant increases in protein and energy consumption, which correlated with significant improvements in 7 out of 8 dimensions of quality of life.<sup>19</sup> In this study, one of the screening tools was a relatively simple scoring system based on BMI and per cent of weight change over the previous 6 months.

In another study, the implementation of a screening program was associated with a 33% reduction ( $P=0.001$ ) in the risk of being malnourished.<sup>20</sup> In that study, screening involved a questionnaire about weight loss and dietary habits as well as weight measures and a subjective assessment of appearance. The commensurate increase in the number of referrals to dietitians was credited with the reduction in the prevalence of malnourishment.

In a controlled study that evaluated nutrition screening costs as well as benefits, the intervention group was screened by the Short Nutritional Assessment Questionnaire (SNAQ), which classifies patients as nourished, moderately malnourished, or severely malnourished on a scoring system.<sup>21</sup> Those identified as being malnourished received standardized nutritional care. The control group consisted of a similar population of patients hospitalized for medical or surgical care. The overall length of stay was reduced by 2.5 days (11.5 vs. 14 days) in the intervention group vs. the control group. The mean investment per day of hospital stay reduction was calculated as (US) \$91. However, the authors anticipated lower costs with better integration of nutrition screening into routine patient care.

In a study that employed the MUST method of screening in acutely ill elderly patients, the 58% of patients at high risk for malnutrition had significantly greater rates of in-hospital ( $P<0.01$ ) and post-discharge mortality ( $P<0.01$ ) as well as significantly longer hospital stays ( $P=0.02$ ) when compared to

---

the 42% at low malnutrition risk.<sup>22</sup> Similarly, a prospective cohort study undertaken in patients older than age 75, which defined malnutrition with the MNA tool, correlated malnutrition with a significant reduction in survival ( $P<0.0001$ ) relative to well nourished patients.<sup>23</sup> In those with severe malnutrition, the relative increase in mortality was more than twofold. In studies of long-term care facilities that evaluated the impact of weight loss alone (independent of nutrition) on outcome, the mortality was 4.6 times higher among those who lost 5% of their body weight over the previous 6 months relative to those who did not.<sup>24</sup>

Although it is reasonable to presume that nutritional status tracks with other measures of debilitation due to illness, there is abundant evidence that this is an independent risk factor that, if treated, is likely to reduce morbidity. In a study of 568 non-terminal patients with a hospital stay of at least 3 days, 6.3% experienced life-threatening complications.<sup>25</sup> In univariate analysis, a variety of factors correlated with increased risk of a complication, such as admission serum albumin levels, but after controlling for severity of illness, the indicators of malnutrition, including recent weight loss, low BMI and low suprailiac skin fold thickness, remained significant. The adjusted relative risk levels ranged from 2.9-fold increase for BMI  $<22$  kg/m<sup>2</sup> to 7.1-fold increase for suprailiac skin fold thickness in the lowest tertile.

The same type of data was generated by an observational study that evaluated an association between malnutrition and hospital stays of at least 17 days.<sup>27</sup> The study evaluated 1274 ambulatory adult patients admitted at a single centre over a 33-month period. Using both a Nutritional Risk Index score, which combines variables indicating malnutrition, and in-hospital weight loss of  $>5\%$ , the relative risk of a prolonged hospital stay was increased by 60% ( $P<0.001$ ). The risk appeared to be largely independent of diagnosis at admission, although statistical significance was not necessarily reached for uncommon conditions.

There are differences between the instruments employed to screen patients at risk for malnutrition and those that diagnose the presence of malnutrition, particularly the need for nutrients that may be disease-specific, such as iron in patients with anemia or vitamin B complex in patients with liver cirrhosis. It is important to recognize that correction of a disease-induced nutrient imbalance may constitute the sole nutritional intervention required within the management of an acute disorder, particularly in younger patients. However, a broader nutritional treatment program may be required in chronic diseases, in patients with multiple disease states or in institutionalized patients who remain at risk for depletion of energy and/or nutrient stores.

### Goals for the Clinician

At any specific institution, the pathways for malnutrition screening may differ, particularly at the point that dietitians

become involved. Whether physicians, nurses or dietitians are responsible for initial screening and evaluation, all staff members should recognize the principles of screening, the goals and the initial treatment strategies. Currently, the high prevalence rates of malnutrition at both acute and long-term care facilities is thought to persist because of the absence of rigorous and well-defined pathways of screening rather than the failure of current pathways to identify cases. Case studies suggest that even visible states of anorexia may be overlooked when the sole clinical focus is on the underlying disease.

While simple methodology to bring cases of potential malnutrition to the attention of staff dietitians is essential, physicians and nurses should remain involved in assessing and addressing obstacles to appropriate nutrition. In patients with or at risk of malnutrition, assuring adequate intake of energy and nutrients becomes part of the therapeutic management and must be understood in this context. A collaborative approach to overcoming obstacles to oral intake of food, which is preferable to enteral intake, is essential. This may involve treating GI symptoms such as bloating that diminish the desire for food, treating oral lesions that make food intake uncomfortable, or considering strategies to circumvent the alterations in taste or smell that can impair eating.

Oral nutritional products are often the first line of defense in patients who are capable of oral intake but cannot maintain adequate nutrition on solid foods for reasons already identified, such as loss of appetite, aversion to food smells, dysphagia or GI discomfort. Taking into consideration the patient's global medical status, individualized nutritional treatments as prescribed or suggested by dietitians can provide adequate nutrients within an optimal balance and ratio of vitamins, minerals and proteins. Moreover, certain products can play a critical role in the overall treatment program. For example, one product employs a short-chained oligosaccharide to nourish resident gut bacteria to improve GI function. The goal is not only to provide nutrition but also to help restore normal digestive function.

In Canada, the Canadian Malnutrition Task Force/ Groupe de travail canadien sur la malnutrition (CMTF) has been formed by concerned health care providers to develop standards to promote nutrition as part of the standard clinical care.<sup>27</sup> The group has initiated a prospective observational study in Canadian hospitals using several nutrition indicators to acquire Canada-specific data. The CMTF monitors food intake as well as changes in various markers of malnutrition in relation to such outcomes as length of stay, complications and death. Along with efforts to track the nutrition care process, it is hoped that this work will lead to an improvement in awareness of in-hospital malnutrition as well as strategies to reduce the incidence.

Dietitians can facilitate a nutritional care strategy, but it is also vital for physicians and nurses to understand the critical role of nutrition as a therapy for disease. The steps to create a

nutritional management pathway are relatively simple, but the principles must be embraced by all directors, clinical managers and members of the clinical staff so that nutrition, rather than an adjunctive service, is integrated into care. In this sense, nutrition is medicine, and such strategies as oral nutrition supplements can be understood as critical components of an effective management strategy. Although clinical efforts are generally focused on a specific pathophysiology, optimal treatments may fail in patients who are inadequately nourished.

## Summary

Malnutrition is an important but under-recognized source of poor outcome in hospitalized and institutionalized patients. The remedies involve integrating routine screening tools into clinical management pathways that emphasize the role of reversing malnourishment in order to improve patient outcomes. Dietitians can evaluate specific nutritional needs, but all clinicians need to be familiar with the impact of unintended weight loss and malnourishment on clinical risk and to understand the principles of screening and treatment. Preserving oral intake of nutrients with such strategies as oral nutritional supplements should be a product of a collaborative effort among those delivering care, recognizing the key role of food intake in the treatment of disease. □

## References

1. Edington et al. Prevalence of malnutrition on admission to four hospitals in England. The Malnutrition Prevalence Group. *Clin Nutr* 2000;19(3):191-5.
2. Corish CA, Kennedy NP. Protein-energy undernutrition in hospital inpatients. *Br J Nutr* 2000;83(6):575-91.
3. Gibney et al. UCD Institute of Food and Health Policy Seminar Series. Executive Summary. Web site: [www.ucd.ed/foodandhealth](http://www.ucd.ed/foodandhealth).
4. Chevalier et al. Dépistage de la dénutrition et impact d'une intervention nutritionnelle chez les personnes âgées en soins de longue durée. *Nutrition-science en évolution* 2008;6(1):17-20.
5. Vanderwee et al. Malnutrition and associated factors in elderly hospital patients: a Belgian cross-sectional, multi-centre study. *Clin Nutr* 2010;29(4):469-76.
6. Singh et al. Malnutrition is prevalent in hospitalized medical patients: are housestaff identifying the malnourished patient? *Nutrition* 2006;22(4):350-4.
7. Sullivan DH, Sun S, Walls RC. Protein-energy undernutrition among elderly hospitalized patients: a prospective study. *JAMA* 1999;281(21):2013-9.
8. Incalzi et al. Energy intake and in-hospital starvation. A clinically relevant relationship. *Arch Intern Med* 1996;156(4):425-9.
9. Ahluwalia N. Aging, nutrition and immune function. *J Nutr Health Aging* 2004;8(1):2-6.
10. Stechmiller JK. Understanding the role of nutrition and wound healing. *Nutr Clin Pract* 2010;25(1):61-8.
11. Berger MJ, Doherty TJ. Sarcopenia: prevalence, mechanisms, and functional consequences. *Interdiscip Top Gerontol* 2010;37:94-114.
12. Saka et al. Malnutrition in the elderly and its relationship with other geriatric syndromes. *Clin Nutr* 2010;29(6):745-8.
13. Charifi et al. Effects of endurance training on satellite cell frequency in skeletal muscle of old men. *Muscle Nerve* 2003 Jul;28(1):87-92.
14. Fiatarone et al. High-intensity strength training in nonagenarians. Effects on skeletal muscle. *JAMA* 1990;263(22):3029-34.
15. Kukuljan et al. Effects of resistance exercise and fortified milk on skeletal muscle mass, muscle size, and functional performance in middle-aged and older men: an 18-month randomized controlled trial. *J Appl Physiol* 2009 Dec;107(6):1864-73. Epub October 22, 2009.
16. An Aging Population. 2010. Web site: <http://atlas.nrcan.gc.ca/auth/english/maps/health/ruralhealth/agingpop/1>.
17. Kyle UG, Coss-Bu JA. Nutritional assessment and length of hospital stay. *CMAJ* 2010;182(17):1831-2.
18. Stratton et al. Malnutrition in hospital outpatients and inpatients: prevalence, concurrent validity and ease of use of the malnutrition universal screening tool (MST) for adults. *Br J Nutr* 2004;92(5):799-808.
19. Babineau et al. Outcomes of screening and nutritional intervention among older adults in healthcare facilities. *Can J Diet Pract Res* 2008;69(2):89-94.
20. O'Flynn et al. The prevalence of malnutrition in hospitals can be reduced: results from three consecutive cross-sectional studies. *Clin Nutr* 2005;24(6):1078-88.
21. Kruijenga et al. Effectiveness and cost-effectiveness of early screening and treatment of malnourished patients. *Am J Clin Nutr* 2005;82(5):1082-9.
22. Stratton et al. Malnutrition Universal Screening Tool predicts mortality and length of hospital stay in acutely ill elderly. *Br J Nutr* 2006;95(2):325-30.
23. Kagansky et al. Poor nutritional habits are predictors of poor outcome in very old hospitalized patients. *Am J Clin Nutr* 2005;82(4):784-91; quiz 913-4.
24. Ryan et al. Unintentional weight loss in long-term care: predictor of mortality in the elderly. *South Med J* 1995;88(7):721-4.
25. Sullivan DH, Bopp MM, Roberson PK. Protein-energy undernutrition and life-threatening complications among the hospitalized elderly. *J Gen Intern Med* 2002;17(12):923-32.
26. Caccialanza et al. Nutritional parameters associated with prolonged hospital stay among ambulatory adult patients. *CMAJ* 2010;182(17):1843-9.
27. Keller HH. A Canadian response to malnutrition in hospitals. (Accessed January 13, 2010. *CMAJ* <http://canadianmedicaljournal.ca/cgi/eletters/182/17/1843>.)

## INTEGRATIVE MEDICINE REPORT®

This publication has been prepared by the editorial team of Medical Education Network Canada Inc.

To view the electronic version of this publication, please visit [www.mednet.ca/2011/ho11-001e](http://www.mednet.ca/2011/ho11-001e).

© 2011 Health Odyssey International. All rights reserved. Integrative Medicine Report is an independent medical news reporting service. Views expressed are those of the author and do not necessarily reflect those of the publisher or sponsor. Any therapies mentioned in this report should be used in accordance with the recognized prescribing information in Canada. Support for distribution of this report was provided by Abbott Nutrition Canada through an educational grant without conditions and under written agreement that ensures independence. No claims or endorsements are made for any compound presently under investigation. No part of this newsletter may be reproduced in any form or distributed without written consent of the publisher. Information provided is not intended to serve as the sole basis for individual care. Our objective is to facilitate physicians' and allied health care providers' understanding of ongoing trends in medicine. Your comments are encouraged.

