



Invited Commentary | Nutrition, Obesity, and Exercise

Nutritional Support Should Target the Cause of Malnutrition in Hospitalized Patients

William J. Evans, PhD

Kaegi-Braun and colleagues¹ have presented a retrospective analysis of the outcomes of nutritional support on hospitalized patients who are malnourished. This study found that nutritional support is associated with small but statistically significant decrease in patient mortality (7.2% vs 8.8%; incidence rate ratio, 0.79 [95% CI, 0.75-0.84]; $P < .001$) and reduced hospital readmission. There are a number of important strengths to this study, principally the very large number and heterogeneity of patients examined and the investigators' attempt to control for a number of variables that may influence the analysis, including scaling or ranking the severity of malnutrition.

The potential strength of nutritional support on outcomes, particularly in patients who are very ill, is powerful; and the study by Kaegi-Braun et al¹ provides additional, valuable evidence of its importance. Although there are many attempts at consensus definitions for diagnosis, determining the nutritional status of hospitalized patients remains difficult. The authors used *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10)* and Swiss Classification of Operations (CHOP) codes to determine degrees of nutritional status. However, these codes are nonspecific and the instruments used for diagnosis rely on weight loss and food intake, both difficult to measure accurately in a hospital setting. The use of these codes to assess nutritional status are designed to result in some type of unspecified nutritional support and the ranking of nutritional risk (not malnutrition) is based on the rate of weight loss (>5% over 1, 2, or 3 months), an extremely difficult value to determine in hospitalized patients with multiple comorbid diseases. In the present study by Kaegi-Braun et al,¹ it is not possible to make any conclusions related to the degree of malnutrition of the patients. The evaluation of nutritional risk should be objective, however, the term malnutrition has subjective connotations, and almost certainly some of the application of specific *ICD-10* codes related to nutritional status were not based on objective criteria. The evidence that ignoring the nutritional status or not treating hospitalized patients who are malnourished results in poor outcomes is strong. However, the data that nutrition support can improve these outcomes is unclear, particularly from prospective randomized trials.²

Treatment of undernutrition and malnutrition presents a number of challenging issues in patients who are hospitalized. The first is diagnosis of a specific treatable nutritional deficiency. Malnutrition has been defined in many ways, but the clinical presentation is weight loss. Diagnostic criteria³ are complex and involve assessments that are not readily available in many clinical settings. This is particularly true for assessments of body composition. In some cases, the loss of body weight results from decreased total energy intake. A reduction in food intake may result from loss of appetite and simply providing a supplement or more food may not result in any change in energy or protein intake without considering or treating the cause of loss of appetite. In hospitalized, bed rested patients, weight loss may result from not only negative energy balance, but also from a rapid decrease in muscle mass. In older people, bed rest can cause a substantial decrease in the rate of muscle protein synthesis, nitrogen balance, and loss of lean mass.⁴ This immobilization-induced decrease in muscle protein synthesis is highly responsive to a nutritional intervention, while accelerated muscle protein breakdown due to inflammation may not be.⁵ It is possible to provide adequate energy to hospitalized patients who are undernourished via enteral or parenteral feeding, with no effects on correcting the loss of muscles. Even in patients who are obese and have cancer, the loss of muscle is an independent risk for mortality.⁶ Accurate measurements of body weight in

+ Related article

Author affiliations and article information are listed at the end of this article.

Open Access. This is an open access article distributed under the terms of the CC-BY License.

hospitalized patients are of great value but changes in body weight without knowledge of components of changes in body composition does not provide sufficient information for targeted nutritional therapy. Evaluation of nutritional status should help to target nutritional interventions to treat specific deficiencies. The inconsistent evidence from prospective studies that nutrition support results in reduced risk of mortality in hospitalized patients who are malnourished suggests that either many of these patients are not responsive to this intervention or that the type of nutrition support provided is nonspecific and not targeted to the cause of poor nutritional status.

The results of Kaegi-Braun and colleagues¹ demonstrate that use of commercial enteral or TPN formulae may improve outcomes in some, but not all, patients who are very ill and malnourished. Nutritional interventions are now available that can provide high-quality protein or formulae with essential amino acids to stimulate muscle protein synthesis and inhibit breakdown, lipids that may reduce inflammation, and/or concentrated energy to reverse loss of body weight. Assessment of nutritional status and diagnosis of the cause of malnutrition is critically important in providing nutrients that treat both malnutrition and its causes.

ARTICLE INFORMATION

Published: January 20, 2021. doi:[10.1001/jamanetworkopen.2020.33925](https://doi.org/10.1001/jamanetworkopen.2020.33925)

Open Access: This is an open access article distributed under the terms of the [CC-BY License](https://creativecommons.org/licenses/by/4.0/). © 2021 Evans WJ. *JAMA Network Open*.

Corresponding Author: William J. Evans, PhD, Department of Nutritional Sciences and Toxicology, University of California, Berkeley, Morgan Hall, Berkeley, CA 94720 (William.Evans@berkeley.edu).

Author Affiliations: Department of Nutritional Sciences and Toxicology, University of California, Berkeley (Evans); Division of Geriatrics, Duke University Medical Center, Durham, North Carolina (Evans).

Conflict of Interest Disclosures: None reported.

REFERENCES

1. Kaegi-Braun N, Mueller M, Schuetz P, Mueller B, Kutz A. Evaluation of nutritional support and in-hospital mortality in patients with malnutrition. *JAMA Netw Open*. 2021;4(1):e2033433. doi:[10.1001/jamanetworkopen.2020.33433](https://doi.org/10.1001/jamanetworkopen.2020.33433)
2. Milne AC, Potter J, Vivanti A, Avenell A. Protein and energy supplementation in elderly people at risk from malnutrition. *Cochrane Database Syst Rev*. 2009;(2):CD003288. doi:[10.1002/14651858.CD003288.pub3](https://doi.org/10.1002/14651858.CD003288.pub3)
3. Cederholm T, Jensen GL, Correia MITD, et al; GLIM Core Leadership Committee, GLIM Working Group. GLIM criteria for the diagnosis of malnutrition - A consensus report from the global clinical nutrition community. *J Cachexia Sarcopenia Muscle*. 2019;10(1):207-217. doi:[10.1002/jcsm.12383](https://doi.org/10.1002/jcsm.12383)
4. Kortebein P, Ferrando A, Lombeida J, Wolfe R, Evans WJ. Effect of 10 days of bed rest on skeletal muscle in healthy older adults. *JAMA*. 2007;297(16):1772-1774. doi:[10.1001/jama.297.16.1772-b](https://doi.org/10.1001/jama.297.16.1772-b)
5. Evans WJ. Skeletal muscle loss: cachexia, sarcopenia, and inactivity. *Am J Clin Nutr*. 2010;91(4):1123S-1127S. doi:[10.3945/ajcn.2010.28608A](https://doi.org/10.3945/ajcn.2010.28608A)
6. Martin L, Birdsell L, Macdonald N, et al. Cancer cachexia in the age of obesity: skeletal muscle depletion is a powerful prognostic factor, independent of body mass index. *J Clin Oncol*. 2013;31(12):1539-1547. doi:[10.1200/JCO.2012.45.2722](https://doi.org/10.1200/JCO.2012.45.2722)