



Malnutrition Diagnosis during Adult Inpatient Hospitalizations: Analysis of a Multi-Institutional Collaborative Database of Academic Medical Centers



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ABSTRACT

Background Malnutrition is a significant problem for hospitalized patients. However, the true prevalence of reported malnutrition diagnosis in real-world clinical practice is largely unknown. Using a large collaborative multi-institutional database, the rate of malnutrition diagnosis was assessed and used to assess institutional variables associated with higher rates of malnutrition diagnosis.

Objective The aim of this study was to define the prevalence of malnutrition diagnosis reported among inpatient hospitalizations.

Design The University Health System Consortium (Vizient) database was retrospectively reviewed for reported rates of malnutrition diagnosis.

Participants/setting All adult inpatient hospitalization at 105 member institutions during fiscal years 2014 and 2015 were evaluated.

Main outcome measures Malnutrition diagnosis based on the presence of an International Classification of Diseases-Ninth Revision diagnosis code.

Statistical analysis Hospital volume and publicly available hospital rankings and patient satisfaction scores were obtained. Multiple regression analysis was performed to assess the association between these variables and reported rates of malnutrition.

Results A total of 5,896,792 hospitalizations were identified from 105 institutions during the 2-year period. It was found that 292,754 patients (5.0%) had a malnutrition diagnosis during their hospital stay. By institution, median rate of malnutrition diagnosis during hospitalization was 4.0%, whereas the rate of severe malnutrition diagnosis was 0.9%. There was a statistically significant increase in malnutrition diagnosis from 4.0% to 4.9% between 2014 and 2015 ($P < 0.01$). Institutional factors associated with increased diagnosis of malnutrition were higher hospital volume, hospital ranking, and patient satisfaction scores ($P < 0.01$).

Conclusions Missing a malnutrition diagnosis appears to be a universal issue because the rate of malnutrition diagnosis was consistently low across academic medical centers. Institutional variables were associated with the prevalence of malnutrition diagnosis, which suggests that institutional culture influences malnutrition diagnosis. Quality improvement efforts aimed at improved structure and process appear to be needed to improve the identification of malnutrition.

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MALNUTRITION IS DEFINED AS AN ACUTE, SUB-acute, or chronic state of nutrition in which a combination of varying degrees of overnutrition or undernutrition with or without inflammatory activity have led to a change in body composition and diminished function.¹ Malnutrition can affect response to medical and surgical therapy and complications and decrease survival.²⁻⁴ Multiple studies have shown direct association with malnutrition and higher complications, including impaired wound healing and increased postoperative infection rates, mortality, length of hospital stay, and cost.⁵⁻⁷ Thus,

nutrition screening has been a required mandate of hospital accreditation by The Joint Commission.⁸

When nutrition assessments are performed with a focused workflow, the diagnosis of malnutrition is a common finding in hospitalized patients. A review of 20 different prospective and retrospective studies aimed at determining the rate of malnutrition in hospitalized patients reported that the prevalence of malnutrition ranged from 20% to 50%, with a weighted mean of all studies of 41.7%.⁹ Seven of these studies used the Subjective Global Assessment tool in determining the prevalence.

Despite the acceptance of the influence of malnutrition on patient outcomes and the prevalence of malnutrition on focused assessment, it has been suggested that malnutrition diagnosis by providers appears to be an underrecognized and unaddressed problem in many hospitals.¹⁰⁻¹² This topic is relevant because a lack of malnutrition diagnosis can have an adverse effect on patient care because malnutrition-based intervention is dependent on screening, assessment, and then diagnosis of malnourished patients. Indeed, recent quality improvement efforts have focused on improving malnutrition care.¹³ However, a necessary component of such quality improvement efforts is to establish a baseline assessment of what is currently occurring in clinical practice.

A study assessing malnutrition diagnoses from discharge data of more than 39 million patients between 1993 and 2010 found that the reported rate was increasing and in 2010 was 3.2%.¹² The purpose of this study was to provide a contemporary evaluation of malnutrition diagnosis, with the hypothesis that the rate of reported malnutrition diagnosis has increased but remains underreported compared with malnutrition assessments. In addition, we sought to evaluate whether institutional factors were associated with increased malnutrition diagnosis. Using a large, collaborative multi-institutional database, the contemporary rate of reported malnutrition diagnosis was determined; furthermore, institutional variables associated with higher rates of malnutrition diagnosis were assessed.

MATERIALS AND METHODS

Patient Population

The University HealthSystem Consortium (UHC) is a collaborative group composed of more than 90% of nonprofit academic medical centers in the United States.¹⁴ In 2015, UHC merged with VHA Inc (a network of not-for-profit health care organizations working in clinical, financial, and operational management) to become Vizient. Currently, there are approximately 112 university medical centers and 250 of their affiliated hospitals in the Vizient network. One of the primary goals of this group is to provide transparent patient data to guide performance improvement. The database has been used for research, and a recent study showed that this administrative database had a high concordance with a well-maintained institutional database on pancreatic cancer.¹⁵

Member institutions within UHC/Vizient contribute patient data that form the Clinical Data Base. At the completion of an inpatient hospitalization, a discharge abstract is extracted which includes all hospital diagnoses. The collection of all discharge abstracts from an institution are then transferred to UHC and loaded into a secure database. The resulting database allows queries from member institutions based on

de-identified patient-level data. For fiscal years 2014 and 2015, data were available from 105 member institutions. Institutional review board approval was received from the University of Iowa Hospitals and Clinics to review UHC data.

Malnutrition Diagnosis

The UHC database was queried to identify all hospitalizations of patients aged ≥ 18 years with a diagnosis of malnutrition on admission or during hospital stay. In cases where a patient record had an International Classification of Diseases-Ninth Revision (ICD-9) code related to malnutrition, the patient was identified as having a malnutrition diagnosis. The study period was before the implementation of ICD-10th Revision, which contains a similar group of codes for mild or moderate and severe malnutrition.

The ICD-9 codes used to identify malnutrition diagnosis included other severe protein-calorie malnutrition (262), malnutrition of moderate degree (263 or 263.0), malnutrition of mild degree (263.1), other protein-calorie malnutrition (263.8), and unspecified protein-calorie malnutrition (263.9). All diagnoses were grouped into "any malnutrition" and separately categorized "severe malnutrition" if code 262 was present.

Institutional Variables

The database was queried for volume of adult hospitalizations across both fiscal years. Institutional intensive care unit (ICU) and mortality rates were evaluated to provide a surrogate for institute complexity. In addition, ICU admissions were used because malnutrition has been shown to have a significant clinical influence in ICU patients.¹⁶

There is no definitive direct measure of hospital quality available because the measurement of hospital quality is controversial. Some groups have reported the association of publicly available hospital rankings with improved treatment of acute myocardial infarction, better outcomes in cardiovascular surgery, and better performance in several cardiovascular quality measures.¹⁷⁻¹⁹ In an attempt to explore potential influence of institutional culture on malnutrition diagnosis, the 2015-2016 *U.S. News and World Report Hospital Rankings by Specialty* was utilized.²⁰ Because these hospital rankings are specialty-specific, the category for gastroenterology and gastrointestinal surgery was the metric evaluated. This metric was chosen because this field has introduced the enhanced recovery after surgery protocols.²¹ The hypothesis is that high-ranking hospitals will have the infrastructure in place to better identify malnourished patients. Hospitals were classified as ranked in cases where they were present in the top 50 vs not ranked.

Patient satisfaction data were obtained from the Medicare Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) data.²² HCAHPS is a standardized survey of Medicare patients for measuring patients' perspectives on hospital care. These patient satisfaction data have been previously used as a tool to evaluate associations between outcomes in surgery.²³

Statistical Analysis

Descriptive statistics were used to report institution characteristics and rates of malnutrition diagnosis. Malnutrition diagnosis was reported as an overall cohort and at the

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