

Student Article:

Missed Documentation of Malnutrition Diagnosis in Hospitalized Patients: Implications for Patient Care and Reimbursement

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ABSTRACT

Background: Protein-calorie malnutrition is associated with many medical problems in hospitalized patients and is often underdiagnosed. Physicians may not recognize indicators of malnutrition or accurately document the diagnosis. Collaborating with dietitians to increase awareness and treatment of malnutrition can improve outcomes and facilitate appropriate reimbursement.

Objectives: To evaluate frequency and accuracy of physicians and dietitians identifying protein-calorie malnutrition in hospitalized adult patients using evidence-based diagnostic indicators.

Design: Cross-sectional study using an electronic survey of clinical vignettes administered over three months.

Participants: Physicians of various medical specialties and dietitians from an academic hospital.

Data Analysis: Chi Square and Fisher tests were used to test for differences between physicians and dietitians in selecting severe protein-calorie malnutrition as a secondary diagnosis in each vignette and differences in using evidence-based diagnostic indicators.

Results: Of 910 eligible participants, (861 physicians and 49 dietitians), 189 responded (21% response rate). Dietitians had a higher response rate (49%) than

physicians (19%). Physicians correctly selected severe protein-calorie malnutrition in 29% (93/316) of cases and dietitians correctly selected it in 69% (31/45) ($p < 0.001$). Physicians more often used albumin and prealbumin as diagnostic indicators. Dietitians more often used evidenced-based indicators such as weight loss, reduced appetite, muscle loss, and fat loss.

Conclusion: Physicians selected severe protein-calorie malnutrition in less than one third of cases and relied on common indicators that are no longer evidence based. Dietitians are well trained to identify and diagnose malnutrition using evidenced-based indicators and make diagnosis recommendations. As malnutrition diagnoses codes are expected to be incorporated into quality reporting requirements, ensuring collaborative identification, treatment, and documentation is important for improving patient outcomes and reimbursement.

Key Words: malnutrition, Medicare, quality measures, interdisciplinary care, coding and billing

INTRODUCTION

Hospitalized adult patients with protein-calorie malnutrition are at high risk for adverse events, prolonged hospital stays, increased rates of readmissions, and mortality.¹ Despite evidence-based interventions such as oral nutrition supplements, nutrition support, and nutrition service consultations that are typically available in hospitals, malnutrition remains under-recognized and undertreated.¹⁻⁷ The prevalence of malnutrition in hospitals

is reported to be as high as 30-50%, and yet analysis of the 2010 Healthcare Cost and Utilization Project data revealed that only 3.2% of discharges had a malnutrition diagnosis code.^{4,8-9}

In recently published consensus guidelines, the American Society for Parenteral and Enteral Nutrition (ASPEN) clinically defined protein-calorie malnutrition in adults as undernutrition using the following evidence-based indicators: weight, muscle and fat loss, reduced intake, edema, and reduced functional capacity.¹⁰ Severe protein-calorie malnutrition is classified as a major complication or comorbidity (MCC) under the Center for Medicare and Medicaid's (CMS) case mix payment program, indicating that malnourished patients require intensive treatment and personnel resources.^{1,10-12} If malnutrition is not identified and documented, then the complexity of a patient's medical illness is not accurately captured for appropriate treatment and reimbursement.¹² CMS is currently reviewing measures for malnutrition screening, assessment, nutritional care plan development, and diagnosis documentation for inclusion in the Hospital Inpatient Quality Reporting and Medicare and Medicaid Electronic Health Record Incentive Program.¹³ However, for initiatives to be effective, health systems must first understand why malnutrition remains underdiagnosed and undocumented.

Inconsistent diagnostic indicators and differing charting responsibilities of physicians and dietitians are potential factors that may explain the high rate of missed malnutrition diagnoses.^{1,14-17} Registered

dietitians are responsible for optimizing patients' nutritional status. Dietitians in the United States rely on ASPEN's evidence-based guidelines as the current standard of practice to assess for malnutrition through the clinical interpretation of physical examination indicators (using Nutrition Focused Physical Examination (NFPE)), weight trends, and dietary intake.^{10,17} When dietitians identify a patient with malnutrition, they implement a treatment plan and document the nutrition diagnostic criteria. When physicians evaluate nutritional status, they tend to use indicators such as anorexia, cachexia, serum albumin, and prealbumin that have limited application for describing comprehensive nutritional problems.^{10,14,17,20-23} While low albumin is associated with "kwashiorkor-like" protein malnutrition, hypoalbuminemia commonly seen in hospitalized patients in developed countries is now understood to be primarily caused by the body's inflammatory response to infection, injury, and disease.^{9,14,20} Studies show that lab values unpredictably change in response to weight loss, calorie restriction, and nitrogen balance in healthy individuals and do not respond to feeding interventions, such as enteral nutrition support, for patients in an acute inflammatory state.^{10,14,20-21} Despite this, albumin remains popular for physicians as an objective indicator of nutritional status in hospitalized patients.¹⁴ If there is a disconnect with dietitians who are trained to recognize and treat nutritional problems and physicians who are ultimately responsible for comprehensive care plans and documentation for coding purposes, then the complexities of patient care may not translate for reimbursement.

This novel study aimed to evaluate the frequency and accuracy of physicians identifying severe protein-calorie malnutrition as an appropriate secondary diagnosis in hospitalized patients. Ensuring consistent diagnosis and proper coding of malnutrition is important prior to implementation of CMS quality measures to optimize patient outcomes with accurate reimbursement reflecting the complexity of malnutrition care. We hypothesized that physicians will under-recognize malnutrition and will use common indicators of albumin and prealbumin.

METHODS:

Setting and Participants: The study was conducted at a large academic institution in Pittsburgh, Pennsylvania. Participants included registered dietitians and physicians (attendings, residents, and fellows) who primarily worked in the medical inpatient setting. Physicians were in the following medical specialties: cardiology, endocrinology, gastroenterology, general internal medicine, family medicine, oncology, pulmonology, and physical medicine and rehabilitation. Dietitians worked across multiple services including critical care as well as medical and surgical units which is typical of an institution with full nutritional services. As part of the study, dietitians and physicians did not receive special education on malnutrition diagnostic criteria or ICD-10 coding. The study was approved by the University of Pittsburgh Institutional Review Board.

Study Design and Procedures: Electronic surveys were developed using REDCap (Research Electronic Data Capture) licensed to the University of Pittsburgh. An email including the consent to partici-

pate and the REDCap secure survey link was sent to department administrators or division directors in each of the medical specialties for distribution to faculty, fellows, and residents. For the dietitians, a co-investigator (MK) who is also the clinical coordinator at the study site hospital sent the email to staff.

The survey was live from February 28, 2017-April 28, 2017. Following the initial survey email, the study team asked departments to distribute formal reminder emails. Due to administrator limitations, cardiology received zero reminders, and physical medicine and rehabilitation received one reminder. All other services received three reminders. Dietitians received two formal email reminders.

The survey consisted of two out of four possible case studies adapted from actual adult patients with a severe protein-calorie malnutrition diagnosis. Cases were developed with input from both dietitian and physician co-investigators. Case studies were piloted to a group of dietitians experienced in malnutrition diagnosis and general medicine physicians for their feedback. Each clinical case vignette (Supplemental Appendix 1) was written in the following format: patient history, physical assessment, labs with reference values, imaging, nutrition assessment, and patient's primary diagnosis. The primary diagnoses for each case were as follows: Survey Version A: Case 1 Bowel Obstruction, Case 2 Gastroparesis and Survey Version B: Case 3 Colon Cancer, Case 4 *Clostridium Difficile* Colitis. Content was designed to reflect variety in acute versus chronic disease states and co-morbidities that impact nutritional status. Survey Version A was sent to cardiology, endocrinology, and

general internal medicine. Survey Version B was sent to family medicine, oncology, gastroenterology, physical medicine and rehabilitation, and pulmonology. Surveys were sent to dietitians at four hospitals within the study site institution to ensure inclusion of multiple service areas and a large sample size. Participants were asked to select the most appropriate secondary diagnosis from five multiple choice answers of ICD-10 codes (Supplemental Appendix 1). E43 Severe protein-calorie malnutrition was included for Cases 1, 3, and 4, and E11.69, E43 Severe malnutrition due to Type 2 diabetes mellitus was used for Case 2.

After selecting a secondary diagnosis, participants listed the clinical indicators used to support their diagnosis in a free response text box. The current evidence-based indicators as defined by the ASPEN guidelines for a severe protein-calorie malnutrition diagnosis (Supplemental Appendix 2: Table S1) were included in each clinical vignette.¹⁰ The ASPEN guidelines were adopted as diagnostic criteria by the study site institution in November 2016. To reduce the potential for bias, participants were prevented from returning to any case to which they had already submitted an answer.

Demographic questions were assessed at the end of the survey. Demographics collected for physicians included: age range, years since medical school graduation, specialty area, and work setting (e.g. inpatient, outpatient, or both). Demographics collected for dietitians included: age range, years in clinical practice, type of hospital unit, and whether participant had previously received formal training in NFPE.^{10,21}

After submitting the survey, participants were directed to a screen revealing severe protein-calorie malnutrition as the preferred answer to the cases and an educational note on the ASPEN diagnostic indicators of malnutrition with two citations for further information.^{1,10}

DATA ANALYSIS:

Main outcomes: Percent correct selection of severe protein-calorie malnutrition as a secondary diagnosis (yes/no) were compared for each case. Chi Square and Fisher Tests were used to test for significant differences between physicians and dietitians, residents and attendings, and among medical specialties for selecting severe protein-calorie malnutrition. Chi Square and Fisher Tests were used to test for significant differences between physicians and dietitians for indicators used to support a selection of severe protein-calorie malnutrition. Logistic regression was used to assess for significant differences between dietitians with and without NFPE training for selecting severe protein-calorie malnutrition. Analysis was performed using STATA14 Texas.²⁵

RESULTS:

Participant demographics are shown in Table 1. The survey was sent to 910 participants, (861 physicians and 49 dietitians) of whom 189 responded for a 21% total response rate. Dietitians had a higher response rate (49%) than physicians (19%).

As seen in Figure 1, there were statistically significant differences between physicians and dietitians for selecting severe protein-calorie malnutrition as a diagnosis across the four cases. Overall, physicians correctly selected severe pro-

tein-calorie malnutrition in 29% (93/316) of cases compared to 69% (31/45) by dietitians ($p < 0.001$).

Table 2 shows the differences between physicians' and dietitians' selection of a secondary diagnosis in each of the four cases. There was a statistically significant difference between physicians and dietitians in selecting severe protein-calorie malnutrition in Cases 1, 2, and 4 ($p < 0.05$). In Cases 1 and 3, severe protein-calorie malnutrition was the most common answer choice for both professional groups. In Case 2, both the physicians and dietitians were less likely to select malnutrition with the most common answer selected by physicians and dietitians being unintentional weight loss of 5% body weight or less within one month.

While dietitians receiving NFPE training were 78% more likely (OR 1.78) to select severe protein-calorie malnutrition than those without training, this difference was not significant ($p = 0.384$).

No statistically significant differences were seen between physicians' specialties or between attendings vs. residents for selecting severe protein-calorie malnutrition. Attendings and residents selected malnutrition in 32% (65/201) and 27% (24/88) of cases, respectively. Medical specialists selected severe protein-calorie malnutrition in the following percent of cases: Cardiology 37% (11/30), Physical Medicine and Rehabilitation 36% (15/42), Gastroenterology 32% (9/28), Family Medicine 29% (11/38), Endocrinology 28% (5/18), Oncology 27% (6/22), General Medicine 27% (21/77), and Pulmonology 25% (7/28).

Table 3 displays the clinical indicators reported by physicians and dietitians

that were used to support their diagnosis of severe protein-calorie malnutrition. A greater percentage of dietitians used the evidence-based ASPEN indicators to support their selection compared to physicians. Differences between professions for indicating decreased intake, weight loss, and muscle loss were statistically significant ($p < 0.001$). A greater percentage of physicians used the common historical indicators of low prealbumin and low albumin, which are no longer included in the ASPEN guidelines ($p < 0.001$).

The physicians' subjective quotes, provided in the survey's free response text box for clinical indicators, give insight into their decision-making process (Table 4). Statements A, E and F show a focus on the patient's acute or primary medical issues during clinical evaluation. Statements B, C, and D emphasize different awareness and application of nutrition terminology.

DISCUSSION:

This study highlights the low frequency and accuracy of physicians identifying severe protein-calorie malnutrition using evidence-based diagnostic indicators in hospitalized adult patients. This represents a great opportunity for physician collaboration with dietitians who more often selected severe protein-calorie malnutrition using ASPEN guidelines across all case studies. Different diagnostic priorities, different applications of nutrition terminology, complexities of charting and coding, and limited dissemination of the most recent ASPEN guidelines may have contributed to the discordance between physicians and dietitians for recognizing malnutrition.^{6,7,10,14-17,19} Dietitians have a crucial

role in communicating the appropriate criteria for malnutrition diagnosis to the interdisciplinary team to improve coordination of nutrition interventions, patient outcomes, and accurate documentation for reimbursement.

This study suggests that when a physician and a dietitian assess the same hospitalized patient a physician is more likely to address acute medical issues and a dietitian will likely focus on nutritional status. This reflects the different views of disease states and priorities during patient assessment that are shaped by the training backgrounds of each profession.^{15-18,23,26} This disconnect in clinical perspectives may lead to gaps in timely treatment and accurate documentation of the complexities of patient care. For example, in Case 4: C Diff Colitis, missing the malnutrition indicators or the dietitian's recommendations may delay the initiation of a nasogastric tube feed, increasing the patient's risk for a poor outcome.¹ Increasing communication between physicians and dietitians would improve outcomes in such cases.^{1,22,26}

The results of this study also highlight areas where enhanced collaboration could facilitate documentation using inclusive terminology to best capture nutritional risk across hospitalized patients for accurate reimbursement. As reflected by the physician comments in Table 4, documentation is a burdensome process; there are numerous ICD-10 codes for nutritional problems, and without formal nutrition training, it can be difficult to discern which code best reflects a patient's problem.¹¹ For example, diagnosing anorexia alone in Cases 1, 2, and 3 oversimplifies the nutritional issue to a single factor. Participants selecting

cachexia in Case 3, a metabolic alteration associated with chronic conditions, may miss early signs of nutritional decline in a acutely ill patient.²⁷ Misinterpreting the importance of weight loss, especially in obese patients as seen in Case 2, and relying on body mass index (BMI) alone may decrease the likelihood of referral to nutritional services.²⁸⁻³⁰

Comparatively, diagnosing malnutrition encompasses multiple indicators that can present in patients with acute or chronic diseases independent of BMI.¹⁰ Documenting malnutrition can improve comprehensive treatment plan development and ensure hospitals are appropriately reimbursed for complex care, as severe protein-calorie malnutrition is a major comorbidity or complication (MCC) under the Medicare Severity-Diagnostic Related Groups (MS-DRG) payment system.^{11-12,31} For example, adding severe protein-calorie malnutrition as an MCC to a primary diagnosis of renal failure can add approximately \$3200 in revenue and to cirrhosis/alcoholic hepatitis can add approximately \$6250 in revenue.¹¹ Additionally, coding severe protein-calorie malnutrition can impact the hospital's case mix index (CMI) which captures the acuity of patients treated in a certain time period and informs many other quality measures.¹² For example, severe protein-calorie malnutrition as an MCC can increase the CMI for renal failure from 0.9655 to 1.5401 and for cirrhosis/alcoholic hepatitis increase the CMI from 0.6084 to 1.0653.¹¹ Dietitians actively engaging with physicians to document nutrition diagnoses creates crucial implications by accurately capturing the impact of malnutrition on hospital resources and the complexity of a physician's individual caseload.^{11-12, 32}

Physicians and dietitians in this study displayed a reliance on different clinical indicators, which may hinder effective collaboration for diagnosing and treating malnutrition. A greater proportion of physicians in this study used albumin and prealbumin as diagnostic indicators for malnutrition compared to a majority of dietitians in this study who did not. While albumin and prealbumin are common historical diagnostic nutritional indicators, the recent ASPEN guidelines concluded that negative acute phase proteins are no longer reliable.¹⁰ The significant reliance on lab values among physicians suggests that the new guidelines have not yet translated into routine clinical practice at the study site, despite the adoption of the ASPEN diagnostic indicators in 2016. Dietitians frequently consulted to see patients for low albumin can have a key role in increasing awareness of evidence-based indicators by capitalizing on such consults as educational opportunities for the interdisciplinary team.

This unique study evaluated a complex issue of educational gaps among practicing health care professionals (HCPs) that is difficult to capture but warrants recognition as a contributing factor to missed malnutrition diagnoses. As health systems continue to assess and report on quality measures, consistent and accurate diagnosis and documentation of malnutrition will become increasingly important. If CMS introduces malnutrition measures into incentive payments as proposed in 2018, it will be pertinent for physicians and dietitians to abandon historic indicators and rely on the evidence-based guidelines to improve patient outcomes and ensure accurate

documentation and reimbursement.^{13,19} Efforts to disseminate up-to-date clinical guidelines and types of malnutrition ICD-10 codes among physicians and dietitians alike are crucial to create a consistent diagnostic process among providers.³³ Health systems should consider incorporating educational initiatives on updated guidelines and malnutrition coding procedures as part of the mandatory annual compliance training, grand round presentations, and new hire orientations.¹² Dietetic programs and medical schools should include the most recent guidelines in the nutrition curriculum and emphasize collaboration between health professionals for optimal patient care.^{23,26}

This study has several limitations that deserve consideration. The survey was only administered to medical specialties, and thus findings cannot be generalized to surgical sub-specialties. Surgeons were excluded because surgical patients have unique risk factors for malnutrition such as optimizing pre-operative nutrition and prolonged inability to eat by mouth that were not fully addressed in this survey's case studies. The survey had a low response rate, which is not uncommon for electronically administered surveys.³⁴ The survey was distributed through work email and may have competed with other important email correspondence and been easily overlooked or not answered by those that may have been traveling or away from the office. The vague description of the study purpose in the consent form may have deterred recipients from participating but was necessary to avoid bias towards selecting nutrition-related answers. Turnover of dietitian staff at the study institution may have contrib-

uted to the low response rate for survey Version B. In attempts to increase the response rate, multiple reminders were sent so that departments received up to three reminders. Internationally, there are other consensus guidelines for diagnosing malnutrition; the ASPEN criteria was used for this study because it is the current standard of practice for dietitians in the United States under the Academy of Nutrition and Dietetics and is used by the study institution as diagnostic criteria.^{35,36} The REDCap system did not have the capacity to randomize the four case studies among all medical specialties; however, this may have had little impact on the findings as there were no significant differences among medical specialties for selecting the malnutrition diagnosis across the four cases. Despite these limitations, this study evaluated the complex issue of diagnosing malnutrition in a novel way and warrants further replication on a larger scale.

Identifying and treating malnutrition in hospitalized patients is important and may soon be integrated into future quality reporting requirements by CMS. Health systems need to ensure dissemination of the most recent evidence-based guidelines for diagnosing and documenting malnutrition to facilitate collaboration among health professionals for improved patient outcomes, accurate documentation and reimbursement.

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Table 1. Participant Demographics[†]

	All N=174 n (%)	Physicians N=152 n (%)	Dietitians N=22 n (%)
<i>Age</i>			
25-34	63 (36)	51 (34)	12 (55)
35-44	43 (24)	42 (28)	1 (5)
45-54	34 (20)	29 (19)	5 (23)
55+	34 (20)	30 (20)	4 (18)
<i>Years In Clinical Practice</i>			
1-3	18 (10)	13 (9)	5 (23)
4-6	36 (21)	30 (20)	6 (27)
7-10	27 (16)	26 (17)	1 (5)
10+	92 (53)	82 (54)	10 (45)
<i>Physician Type</i>			
Attending		107 (71)	
Resident		44 (29)	
<i>Practice Setting</i>			
Inpatient		19 (13)	
Outpatient		29 (19)	
Both		103 (68)	
<i>Medical Specialty</i>			
Cardiology		15 (10)	
Endocrinology		9 (6)	
General Internal Medicine		40 (26)	
Family Medicine		19 (13)	
Gastroenterology		14 (9)	
Oncology		11 (7)	
Physical Medicine and Rehabilitation		21 (14)	
Pulmonology		15 (10)	
Other*		7 (5)	
<i>Nutrition Focused Physical Examination Training</i>			
Yes			11 (50)
No			9 (45)
Unsure			1 (5)

*3 Hematology, 1 Critical Care, 3 Unknown

[†]N may vary, each demographic questions was not answered by all participants

Figure 1. Physicians and Dietitians Selection of Secondary Diagnoses Across All Cases

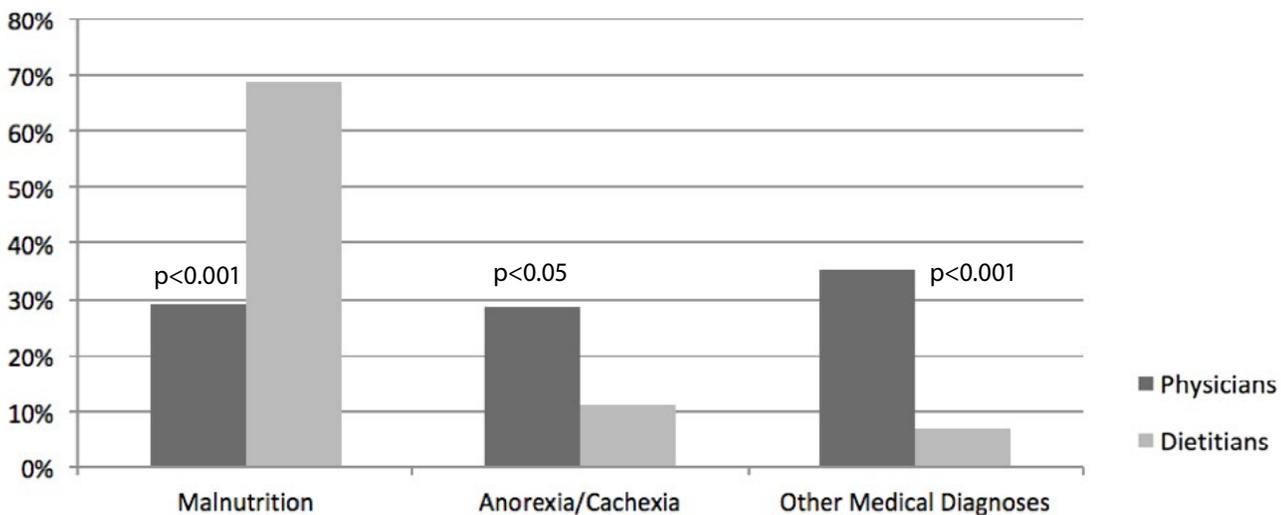


Table 2. Physicians and Dietitians Selection of Secondary Diagnoses in Each Case

	Physician n(%)	Dietitian n(%)	P Value
Case 1: Bowel Obstruction	N=70	N=17	
<i>Severe protein-calorie malnutrition</i>	33 (47)	14 (82)	0.009*
<i>Anorexia</i>	10 (14)	1 (6)	
<i>Prerenal azotemia</i>	7 (10)	0 (0)	
<i>Dehydration</i>	12 (17)	2 (12)	
<i>Hypokalemia</i>	8 (11)	0 (0)	
Case 2: Gastroparesis	N=64	N=16	
<i>Severe malnutrition due to Type 2 diabetes mellitus</i>	3 (5)	7 (44)	<0.001*
<i>Anorexia</i>	14 (22)	2 (13)	
<i>Unintentional weight loss of 5% body weight or less within 1 month</i>	43 (67)	7 (44)	0.083
<i>Low serum prealbumin</i>	1 (2)	0 (0)	
<i>Dehydration with hyponatremia</i>	3 (5)	0 (0)	
Case 3: Colon Cancer	N=92	N=6	
<i>Severe protein-calorie malnutrition</i>	36 (39)	5 (83)	0.079
<i>Anorexia</i>	20 (22)	0 (0)	
<i>Cachexia</i>	22 (24)	1 (17)	
<i>Hypoalbuminemia</i>	6 (7)	0 (0)	
<i>Iron deficiency anemia due to chronic blood loss</i>	8 (9)	0 (0)	
Case 4: C Diff Colitis	N=86	N=6	
<i>Severe protein-calorie malnutrition</i>	19 (22)	5 (83)	0.004*
<i>Dehydration with hypernatremia</i>	35 (41)	0 (0)	
<i>Diarrhea with dehydration</i>	20 (23)	0 (0)	
<i>Malabsorption syndrome</i>	9 (10)	1 (17)	
<i>Diarrhea associated with pseudomembranous colitis</i>	3 (3)	0 (0)	

*statistically significant at p<0.05

Table 3. Reported Indicators Used by Physicians and Dietitians to Support Selection of Malnutrition as Secondary Diagnosis

	Physicians	Dietitians	P value
ASPEN Indicators			
Decreased Intake*	27% (25/91)	81% (25/31)	<0.001
Weight Loss*	53% (48/91)	97% (30/31)	<0.001
Muscle Loss*	25% (23/91)	65% (20/31)	<0.001
Fat Loss[†]	33% (1/3)	43% (3/7)	1.000
Edema[‡]	9% (8/88)	13% (3/24)	0.700
Historic Indicators			
Low Prealbumin[§]	79% (26/33)	0% (0/14)	<0.001
Low Albumin[‡]	72% (63/88)	4% (1/24)	<0.001

*Decreased intake, weight loss and weight loss were reported in Case 1, 2, 3 and 4

[†]Fat loss was reported in Case 2 only

[‡]Edema and low albumin were reported in Case 1, 3 and 4

[§]Low prealbumin was reported in Case 1 only

^{||}statistically significant at p<0.001