

Applied nutritional investigation

Malnutrition is prevalent in hospitalized medical patients: Are housestaff identifying the malnourished patient?

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Abstract

Objective: Malnutrition is highly prevalent in hospitalized patients and is often not identified by the medical staff. Clinical nutrition and nutritional assessment are often neglected components of the curriculum of medical schools. The effect of instruction of nutritional assessment early in medical school on nutritional practice in clinical training is unknown. Four years after the introduction of nutritional assessment in the medical school curriculum, we assessed the knowledge of medical students and residents of nutritional assessment and the practice of this clinical skill in hospitalized medical patients.

Methods: We determined the nutritional status of 69 patients on a general medical ward within 10 d of their hospital admission. Hospital records were reviewed to determine the documentation of nutrition-related issues and practices. A questionnaire was then administered to the housestaff to determine their knowledge of assessment of nutritional status.

Results: Significant malnutrition was found in 69% of patients. Only one patient was identified as being malnourished by the housestaff. References to nutritional status were recorded in two patient charts. History of weight loss, appetite status, current oral intake, and functional status were recorded for fewer than 33% of patients. Although measurements of visceral protein stores (albumin and prealbumin) did not correlate with nutritional status, medical students and residents considered these to be the best markers of nutritional status.

Conclusions: Malnutrition is common in hospitalized patients. Instruction of second-year medical students in assessment of nutritional status does not result in improved knowledge or practice of nutritional assessment in the clinical training years as medical housestaff. Additional instruction in nutritional assessment during clinical training needs to be emphasized. Hospitals need to develop standardized protocols for assessment of nutritional status. © 2006 Elsevier Inc. All rights reserved.

Keywords: Malnutrition; Nutritional assessment; Hospitalized medical patients

Introduction

The high prevalence of malnutrition in hospitalized patients was first described in the late 1970s [1]. Since this initial description, high rates of malnutrition continue to be reported in different patient populations, with reported prevalence rates as high as 75% [2–6]. In addition, hospitalized patients frequently experience deterioration in their nutritional status [7]. Malnutrition has been associated with

increased risk of in-hospital morbidity and mortality and increased length of stay, cost, and use of health care resources [5,8–11]. Clinical nutrition is an often neglected part of the medical school curriculum of North American medical schools. In many centers nutritional assessment is not part of the curriculum and, as a result, nutritional assessment of the hospitalized patients may be overlooked [3,4,7,12].

Although there is no gold standard “test” for determining the nutritional status of a patient, the Subjective Global Assessment (SGA) is a clinical tool that is reproducible and has been shown to predict hospital-related complications

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[13,14]. It is included in the *Journal of American Medical Association* Physical Examination series, which is part of recommended reading in internal medicine residency training in Canada. We previously showed that second-year medical students can successfully learn SGA in a single 3-h seminar [15]. In this previous study, students were able to learn the theoretical concepts and the performance of SGA in a single session. SGA and nutritional assessment were introduced in the medical school curriculum of our university about 4 y ago. It is unclear whether this education has had any effect on the nutritional management of hospitalized patients by more senior housestaff. We hypothesized that teaching this clinical skill early in medical school would result in the recognition of malnourished hospitalized patients by senior medical students and residents.

This prospective study assessed the documentation of nutritional assessment in these patients by housestaff and knowledge of housestaff with regard to nutritional assessment.

To determine how frequently housestaff were deficient in documenting nutritional status, the prevalence of malnutrition in hospitalized general medical patients who were admitted during the study period was determined with the SGA.

Materials and methods

Study protocol

The study protocol was approved by the University of Manitoba research ethics board. The study was performed on the clinical teaching unit at the St. Boniface General Hospital. Because there are no subspecialty units at this hospital, all patients who require medical admission to the hospital are admitted to this teaching unit. Housestaff rotate onto this service at 1- to 2-mo intervals. Patients admitted to the hospital during three different periods were considered for the study. All patients who were admitted over a 10-d span in each of these periods were considered for the study. Patients who could not give consent because of cognitive impairment were excluded from the study.

Patients were interviewed by the study investigators (H.S., K.W., M.C., and R.V.) and their nutritional status was determined with the SGA, as described by Detsky et al. [16] and Baker et al. [17]. Three of the study investigators at the time of the study were gastroenterology fellows (H.S., K.W., and M.C.) and the fourth was a dietitian (R.V.). All four had received similar instruction in the performance of an SGA. Subsequently the patient charts were reviewed to determine the recording of nutritional assessment by the housestaff. Documentation of height, weight, weight loss, oral intake and decreased appetite, gastrointestinal review of systems, functional status, muscle wasting, subcutaneous fat loss, albumin and prealbumin levels, and classification of nutritional status was noted. In addition, inclusion of nutri-

Table 1
Demographics of hospitalized patients*

Age (y)	
20–40	4 (5.8)
41–60	15 (21.7)
61–70	19 (27.5)
71–80	18 (26.1)
>80	12 (17.4)
Diagnosis	
Cardiovascular disease	20 (30)
Infectious disease	10 (14.5)
Gastrointestinal disease	8 (11.6)
Hematologic disease	4 (5.8)
Respiratory disease	4 (5.8)
Weakness	7 (10.1)
Neurologic disease	2 (2.9)
Other	14 (20.2)

* Data are presented as number of patients (percentages).

tion as a significant medical problem in the problem list was noted.

At the end of each study period, the housestaff who rotated through the clinical teaching units and were taking care of the enrolled patients were requested to fill out a study questionnaire regarding their knowledge of nutritional assessment (Appendix).

Statistical analysis

Results are reported as descriptive percentages. Correlation of nutritional status as determined by the study investigators and serum albumin levels was analyzed by analysis of variance.

Results

The study population consisted of 69 patients whose mean age was 66 y. Men comprised 42% of the study sample. The most common indications for hospital admission were cardiovascular disorders followed by various infectious conditions (Table 1). As shown in Fig. 1, 69% ($n =$

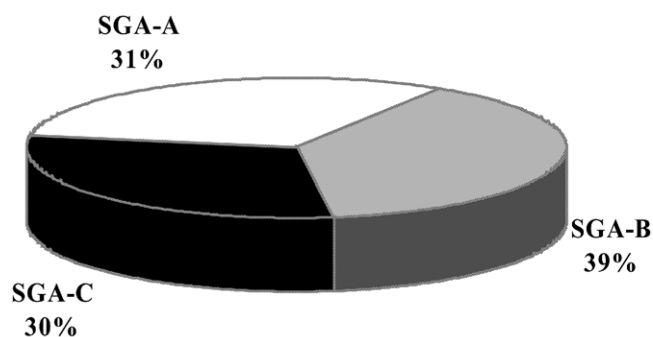


Fig. 1. Nutritional assessment of hospitalized patients. SGA, Subjective Global Assessment.

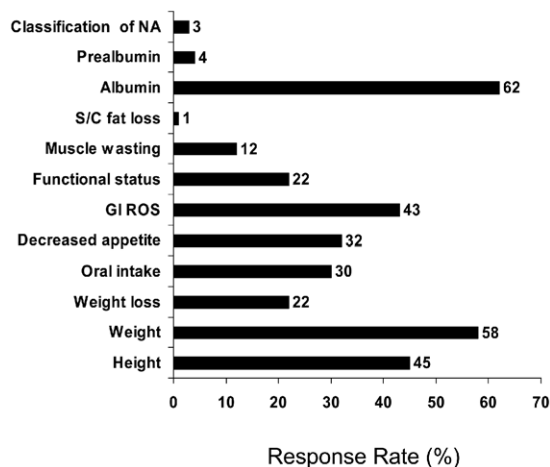


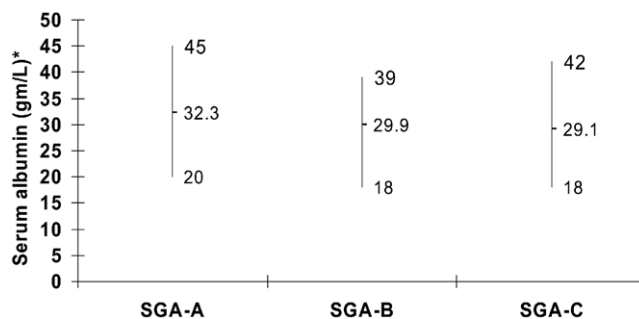
Fig. 2. Documentation of nutrition-related parameters. Results are expressed as percentages of charts with documentation by medical housestaff. GI ROS, gastrointestinal review of systems; NA, nutritional assessment; S/C, subcutaneous.

48) of all patients were found to be malnourished, with 30% ($n = 21$) being severely malnourished (SGA-C) and 39% ($n = 27$) being moderately malnourished (SGA-B).

On review of the hospital charts (Fig. 2), only two records were found to have direct comments on the patients' nutritional status. For all admissions to the hospital, the nursing intake form includes a section for recording the height and weight at admission. This form and the rest of the hospital chart was reviewed to find documentation of patients' height and weight; 45% ($n = 31$) of the records had patients' heights and 58% ($n = 40$) had patients weight mentioned. We did not quantitate in this study the number of patients who actually had their height and weight measured in hospital but this was a minority of individuals. History of weight loss, appetite status, current oral intake, and functional status were recorded in fewer than 33% of patients (Fig. 2). A gastrointestinal review of systems was performed in fewer than 50% of patients. A comment on current muscle mass was present in about 10% of records. Serum albumin on admission was checked in most patients (62%). We found malnourishment in 6 of the 48 malnourished patients (12.5%), and a formal consult to the nutritional support team or to a dietitian was found in the hospital chart. All of these six patients were classified as being severely malnourished (SGA-C). In only one patient was malnutrition listed as a significant medical problem.

We found no correlation between nutritional status and serum albumin levels at admission in the 43 patients, in whom it had been measured (Fig. 3; $P = 0.44$).

The 25 housestaff involved in the day-to-day care of patients were given the study questionnaire toward the end of each study period. There were eight fourth-year medical students and 17 residents; 15 of the 25 housestaff were graduates of University of Manitoba Medical School. Teaching of nutritional assessment by SGA had been introduced in the medical school curriculum at University of



*Results expressed as mean and range.
There was no statistical difference by ANOVA ($p=0.44$)

Fig. 3. Serum albumin according to SGA category. Results are expressed as mean and range. There was no statistical difference by analysis of variance ($P = 0.44$). SGA, Subjective Global Assessment.

Manitoba 4 y previously and all of the 15 current or former graduates of the school would have been exposed to it. Of the seven housestaff who reported that they had heard of the SGA, three did not remember where they had heard of it and one thought he had heard about in psychiatry. Only one medical resident thought he could perform the SGA. This was a third-year medicine resident who had just rotated through an elective in gastroenterology. He was also the only resident who could list the four major components of the SGA.

Most of the housestaff thought that serum albumin was the best way to measure nutritional status. The next best parameter was thought to be serum prealbumin. History of weight loss was thought to be the best measurement by only one resident. The other responses were as listed in Tables 2 and 3.

Discussion

This study has demonstrated a high prevalence of malnutrition in recently hospitalized medical patients at a Canadian tertiary care center (69%), with prevalence rates similar to the those reported in other centers [2,6,18]. Documentation of malnutrition in the hospital chart by housestaff was deficient in most cases and there were very few

Table 2
Housestaff awareness of the SGA

Residents	17 (68%)
Medical students	8 (32%)
University of Manitoba	15 (60%)
Heard of SGA	7 (28%)
In psychiatry	1
In medical school	2
From dietitian	1
Components of SGA	1 (4%)
Ability to perform SGA	1 (4%)

SGA, Subjective Global Assessment

Table 3
Housestaff responses to questionnaire

Best measurement of nutritional status	
Weight	8 (32%)
Weight loss	1 (4%)
Albumin	14 (56%)
Prealbumin	8 (32%)
Oral intake	4 (16%)
Skin fold thickness	3 (12%)
Muscle wasting	0
Loss of S/C fat	0
BMI	2 (8%)
Important components on history of nutritional assessment	
Oral intake	22 (88%)
Weight loss	12 (48%)
GI symptoms	7 (28%)
Important components on examination of nutritional assessment	
Body weight	10 (40%)
Appearance	7 (28%)
Edema	4 (16%)
Muscle wasting	10 (40%)
Skinfold thickness	2 (8%)
Loss of S/C fat	6 (24%)
Good laboratory measurements of nutritional status	
Prealbumin	15 (60%)
Albumin	19 (76%)
Radiographs	7 (28%)
INR	3 (12%)

BMI, body mass index; GI, gastrointestinal; INR, international normalized ratio; SC, subcutaneous

instances where nutritional status was one of the stated problems. Malnutrition is a risk factor for increased morbidity and mortality of hospitalized patients [7,11,19]. Identification of malnourished patients is important so that appropriate nutritional intervention can be undertaken. In some institutions there is a process in place to screen patients for potential malnutrition. This is not present in many hospitals or outpatient settings, and because of the significant prevalence of malnutrition, we feel that an ability to assess nutritional status for evidence of malnutrition is an important clinical skill that physicians should possess. Nutritional assessment is considered to be an important part of the curriculum for medical students [20,21].

Other studies have also suggested that nutritional assessment of hospitalized patients is often overlooked by physicians [3,4,7,22]. Nutritional assessment is a necessary prerequisite before nutritional support can be offered to the malnourished patients. McWhirter and Pennington [7] reported that, of the 200 malnourished patients identified in their study, fewer than 50% had any nutritional information documented. Of the 132 patients who were followed at discharge, there was a mean weight loss of 5.4%; however, the 10 malnourished patients who were referred for nutritional support gained a mean weight of 7.9%.

Our study suggests that this deficit in practice is present

early in clinical training, confirming that it is a skill not taught to senior medical students and medical residents. Although nutritional assessment has been taught to second-year medical students at our institution for the past 4 y and 60% of the housestaff surveyed received their undergraduate training at the University of Manitoba, a minority had heard of the SGA and none could perform this assessment skill. Therefore, there is a need for additional instruction and an emphasis of this skill in the clinical training years. Cheskin et al. [23] used a small group teaching session to improve the ability of medical housestaff to identify the malnourished patient. In this study, medical housestaff were reassessed within 1 mo of receiving this instruction. The ability of such a session to result in a sustained practice of identification of the malnourished patient is unknown. However, unless this is a regular expectation of medical housestaff, it is unlikely to be sustained in the long term. Integration of the SGA into the admitting history and physical examination is likely to be the most effective way of emphasizing the importance of nutrition in hospitalized patients. In addition, continuing medical education courses and symposia, such as those organized by the American Gastroenterological Association for practising physicians (<http://www.gastro.org/nutrition/>), are needed to raise the level of awareness and skills of nutritional assessment among physicians.

Many different methods have been described to assess an individual's nutritional status [24]. The SGA is included in the *Journal of the American Medical Association Series on Physical Examination*, a series that is required reading at our institution for medical residents [25]. This is the only nutritional physical assessment skill that has been validated and is recommended by the American Society of Parenteral and Enteral Nutrition [26]. For these reasons, we believe that this method should be taught and practiced by medical housestaff. Our survey demonstrated that considerable misconceptions remain about the interpretation of visceral proteins and nutritional status. In hospitalized patients, these proteins are usually a reflection of underlying physiologic injury as opposed to malnutrition [27]. Albumin levels are predictors of morbidity and mortality and therefore are important in the overall patient assessment [28,29]. In addition, they provide useful information as to how catabolic a patient may be. However, these levels do not independently predict whether or not an individual is malnourished.

In conclusion, we have demonstrated that malnutrition continues to be a significant problem of hospitalized patients that is under-recognized by medical housestaff. Instruction of second-year medical students in the use of the SGA does not improve the knowledge or practice of nutritional assessment in the clinical training years as medical housestaff. Programs need to be developed that integrate the SGA into the routine admitting history and physical examination of hospitalized patients.

Appendix.

Housestaff questionnaire

Post graduate year/Medical student year _____

Medical school attended _____.

Year of graduation from medical school _____

Have you ever heard of the Subjective Global Assessment (SGA)?

Yes _____ No _____

If you have heard of the SGA, where did you learn about it?

If you have heard of the SGA, list the components of this assessment.

Are you able to perform an SGA on a patient?

Yes _____ No _____

What in your opinion is the best way to measure an individual's nutritional status?

What factors on history are important in nutritional assessment?

What physical examination features are important in nutritional assessment?

What laboratory/x-ray tests are good measures of nutritional status?

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