Hospital Malnutrition: The Brazilian National Survey (IBRANUTRI): A Study of 4000 Patients

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OBJECTIVE: We assessed nutrition status and prevalence of malnutrition in hospital patients as determined by the Subjective Global Assessment Form, awareness of patients' nutrition status by health teams, and the use of nutrition therapy.

METHODS: We enrolled 4000 hospital patients at least 18 y old who were covered by the Brazilian public health care system in a cross-sectional, multicenter epidemiologic study. We used Student's *t* and chi-square tests for univariate and multiple logistic regression analyses.

RESULTS: Malnutrition was present in 48.1% of patients and severe malnutrition was present in 12.5% of patients. The prevalence of malnutrition was higher in the northern and northeastern regions of Brazil, where per-capita income is lower. Malnutrition correlated with primary diagnosis at admission, age (60 y), presence of cancer or infection, and longer hospital stay ($P < 0.05$). Fewer than 18.8% of patients' records contained information on nutrition-related issues. Nutrition therapy was used in 7.3% of patients (6.1% enteral nutrition and 1.2% parenteral nutrition).

CONCLUSIONS: The prevalence of malnutrition in hospitalized patients in Brazil is high, physician awareness of malnutrition is low, and nutrition therapy is underprescribed. *Nutrition* 2001;17:573–580.

KEY WORDS: nutrition assessment, malnutrition, nutrition awareness, cost benefit

INTRODUCTION

Malnutrition in hospitalized patients is a critical issue and has been associated with a significant increase in morbidity and mortality.[1–4] Worldwide studies have indicated that between 30% and 50% of hospitalized patients have some degree of malnutrition.[5] In Brazil, the compromised nutrition status of patients, in particular those recovering from gastrointestinal surgery, has been reported frequently.[6–9]

Malnutrition in hospitalized patients generally is related to a high rate of infectious complications and increased mortality rates.[10–13] Complications secondary to malnutrition directly increase length of stay and hospital costs and indirectly affect the cost of patient rehabilitation.[14] The total impact of hospital malnutrition on social and health care costs is multifactorial and generally underestimated.

In the past 30 y, several methods and techniques for nutrition assessment[15–19]and enteral and parenteral therapies[20–23] have been developed. However, despite the availability of these diagnostic and therapeutic tools, hospital malnutrition continues to be as prevalent as it was 25 y ago.[3–5,24]

The Brazilian National Survey on Hospital Nutritional Assessment (IBRANUTRI) study was designed to provide missing information regarding the nutrition status of hospitalized patients covered by the Brazilian public health care system (SUS). Specifically, the prevalence of malnutrition, awareness of nutrition status in hospitalized patients, and the use of nutrition therapy were assessed. The Brazilian Society of Parenteral and Enteral Nutrition (SBPNE) performed this study to promote awareness of malnutrition and initiated a general call for action in the health care system. The IBRANUTRI is the largest study of nutrition status in hospitalized patients conducted to date in Brazil, a country with many dietitians.

SUBJECTS AND METHODS

The IBRANUTRI was a multicenter, cross-sectional, epidemiologic study covering 12 Brazilian states and the Federal District. The study was carried out over 6 mo, from May 1 to October 30, 1996. Four thousand hospitalized SUS patients were included in this study. SUS is responsible for the health care of 80% of the Brazilian population. The average hospital admission rate for SUS patients included in the study was estimated to be 15 million per year.[25] Sample size was calculated by assuming a 50% prevalence rate of malnutrition,[6,10,24–28] a 0.05% level of significance, 90% power,[26] and a 20% missing-data rate.

Hospitals were included in the study if they were general hospitals, admitted SUS patients, had at least 200 beds, and had hospital administrations and ethical committees that could give consent to participate. Twenty-five hospitals widely distributed over 12 states and the Federal District met the inclusion criteria and were used as study sites.

Sixteen research teams, consisting of 120 interviewers, were formed. Each of the 25 hospitals had a research team. Each

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TABLE I.

DISTRIBUTION OF STUDY SUBJECTS BY GENERAL CONDITION

Medical condition	*n* Patients ($N = 4000$)	%
Cardiovascular	1088	27.2
Gastrointestinal	680	17.0
Genitourinary	551	13.8
Respiratory	409	10.2
Musculoskeletal	241	6.0
Neurologic	188	4.7
Autoimmune disease	154	3.9
Metabolic disorder	151	3.8
Sensory-organ impairment	113	2.8
Trauma	111	2.8
Hematopoietic disorder	107	2.7
Other	207	5.2

team was directly involved in data collection. Every team had a coordinating physician or dietitian (all of them nutrition experts) in charge of regularly testing data accuracy. Each interviewer was personally trained by one of the authors to guarantee data collection and accuracy of nutrition assessment. Registered dietitians conducted most (48.8%) of the interviews. The remaining interviews were conducted by physicians (17.8%), nutrition students (11.2%), and other health care professionals (22.2%).

The details pertaining to the study methods, including forms used and data-collection information, have been published.[27] The patients were selected randomly every week with the use of a computer software program. Eligible hospital patients had to be at least 18 y old. Only obstetric and pediatric beds were excluded. Comatose patients without relatives or friends to answer the nutrition-assessment questions also were excluded. Patients at least 60 y old were considered elderly.[28] Randomization continued until the predetermined sample size of 4000 was attained.

After subject enrollment, we began the study with a chart review. Medical records were analyzed for data retrieval according to selected epidemiologic variables: date of nutrition assessment, sex, age, race, origin, literacy, and clinical variables. Clinical variables consisted of data related to the main admission diagnoses (as registered in the medical records by the responsible physician), which were then classified, by the study coordinator (M.I.T.D.C.), into 11 broad categories (Table I). The diagnostic categories corresponded to the general type of medical condition, regardless of etiology. Diseases or conditions not identified at the time of interview in the medical records were categorized as "other." Patients also were scored according to the presence or absence of cancer and/or infection (at admission) as recorded in the medical records (Table II). Surgical and medical treatments were recorded in accordance to the information given by the assistant physician.

Weights (usual and admission weights), heights, serum albumin levels, and total lymphocyte counts were recorded if they were present in medical records but were not used to evaluate or define a patient's nutrition status. Medical awareness of nutrition status as noted in medical charts (words or phrase such as "skinny," "malnourished," or "refers having lost weight") was recorded. Information related to nutrition orders was collected by noting non-oral, oral, enteral, and parenteral intakes.

The second part of the study consisted of interviewing all patients and conducting nutrition assessments based on the Subjective Global Assessment Form (SGA), as described by Detsky et al. (Fig. 1).[29] SGA was established for nutrition assessment performed within 48 h of admission. However, we used the SGA for the entire group at different times during hospitalization. The interviewers were trained to consider all changes pertaining to body weight, gastrointestinal symptoms, food intake, and functional capacity before admission to the hospital. The patients were questioned about recent body-weight changes, gastrointestinal symptoms, food-intake changes and habits, alterations in functional capacity, and metabolic demands. Patients then underwent brief physical examinations conducted by the research teams.[29] Malnutrition was defined and based on the SGA.

Statistical analyses were performed with Epiinfo version 6.0 (Epiinfo, Atlanta, GA, USA) and SPSS version 6.12 (Statistical Package for Social Sciences, Chicago, IL, USA). The statistical analysis included frequency distributions of all variables. The odds ratio (OR) measured the association between risk factors and malnutrition. Student's *t* test was used for continuous variables, and the chi-square test was used for univariate analysis. $P < 0.05$ was considered statistically significant. The variables identified as risk factors for malnutrition by the univariate analysis were then entered into a multiple regression-analysis model.

RESULTS

Population Sample

Four thousand patients covered by SUS were selected randomly in 25 Brazilian hospitals widely distributed over 12 states and the

TABLE II.

MALNUTRITION IN RELATION TO AGE, CANCER, AND INFECTION

Variable	1 (%)		Total	Odds ratio	95% Confidence interval
	Malnourished	Well nourished			
Age					
>60	761 (52.8)	680 (47.2)	1441	1.18/0.85 = 1.39*	1.21–1.58
<60	1144 (44.7)	1415 (55.3)	2559		
Cancer					
Present	533 (66.3)	271 (33.7)	804	1.55/0.59 = 2.63*	2.28–3.18
Absent	1372 (42.9)	1824 (57.1)	3196		
Infection					
Present	959 (61.4)	604 (38.6)	1563	1.58/0.63 = 2.50*	2.24–2.93
Absent	946 (38.8)	1491 (61.2)	2437		

* $P < 0.05$.

Subjective Global Assessment of Nutritional Status

A. History

1. Weight Change
   Overall loss in past 6 months: _____ kg % loss _____
   Change in past 2 weeks: _____ increase _____
   no change _____ decrease_____

2. Dietary intake change relative to normal
   No change _____
   Change: duration _____ weeks _____
   Type: sub-optimal solid diet _____ full liquid diet _____
   hypocaloric liquid _____ starvation _____

3. Gastrointestinal symptoms (persisted for 2 weeks)
   None _____ Nausea ____ Vomiting _____ Diarrhea _____ Anorexia _____

4. Functional Capacity
   No dysfunction _____
   Dysfunction: duration _____ weeks_____
   Type: working sub-optimally _____ ambulatory _____ bedridden _____

5. Disease and its relationship to nutritional requirements
   Primary diagnosis: _____
   Metabolic demand/Stress: no _____ low _____ moderate _____ high _____

B. Physical (for each specify: 0=normal, 1+=mild, 2+=moderate, 3+=severe)
   Loss of subcutaneous fat (triceps, chest) _____
   Muscle wasting (quadriceps, deltoids) _____
   Ankle edema _____ Sacral edema _____ Ascites _____

C. Subjective Global Assessment Rating
   Well nourished A _____
   Suspected or moderately malnourished B _____
   Severely malnourished C _____

FIG. 1. Subjective Global Assessment Form. Printed with permission from American Society of Parenteral and Enteral Nutrition (ASPEN).

Federal District (Fig. 2). The bed-distribution pattern in the enrolled hospitals closely resembled the national bed-distribution pattern (44.4% of governmental origin, 26.1% from universities, 14.4% from private institutions, and 14.1% from philanthropic hospitals). Demographic data on the study population are shown in Table III.

The patients were hospitalized for a variety of conditions (Table I). Almost half of the subjects (49.5%) were hospitalized because of medical conditions. The remaining 50.5% of patients were admitted for surgical procedures. Cancer was present in 20.3% and infection in 39% at admission. A total of 878 patients (22.1%) was seen within the first 48 h after hospital admission, and 27.9% were seen within 3 to 7 d after admission. Another 23.3% were analyzed within 8 to 15 d of their hospital stay, and 26.7% were studied after at least 16 d of hospitalization.

Hospital Malnutrition in Brazil

The prevalence of malnutrition determined by SGA was 48.1% in 4000 patients. Severe malnutrition was diagnosed in 12.6%. The prevalence of malnutrition was higher in the representative hospitals and cities in the northern and northeastern regions of the country. In the northern city of Belém (Pará), 78.8% of the patients were malnourished; in the northeast 76% in Salvador (Bahia) and 67.6% in Natal (Rio Grande do Norte) were malnourished. The

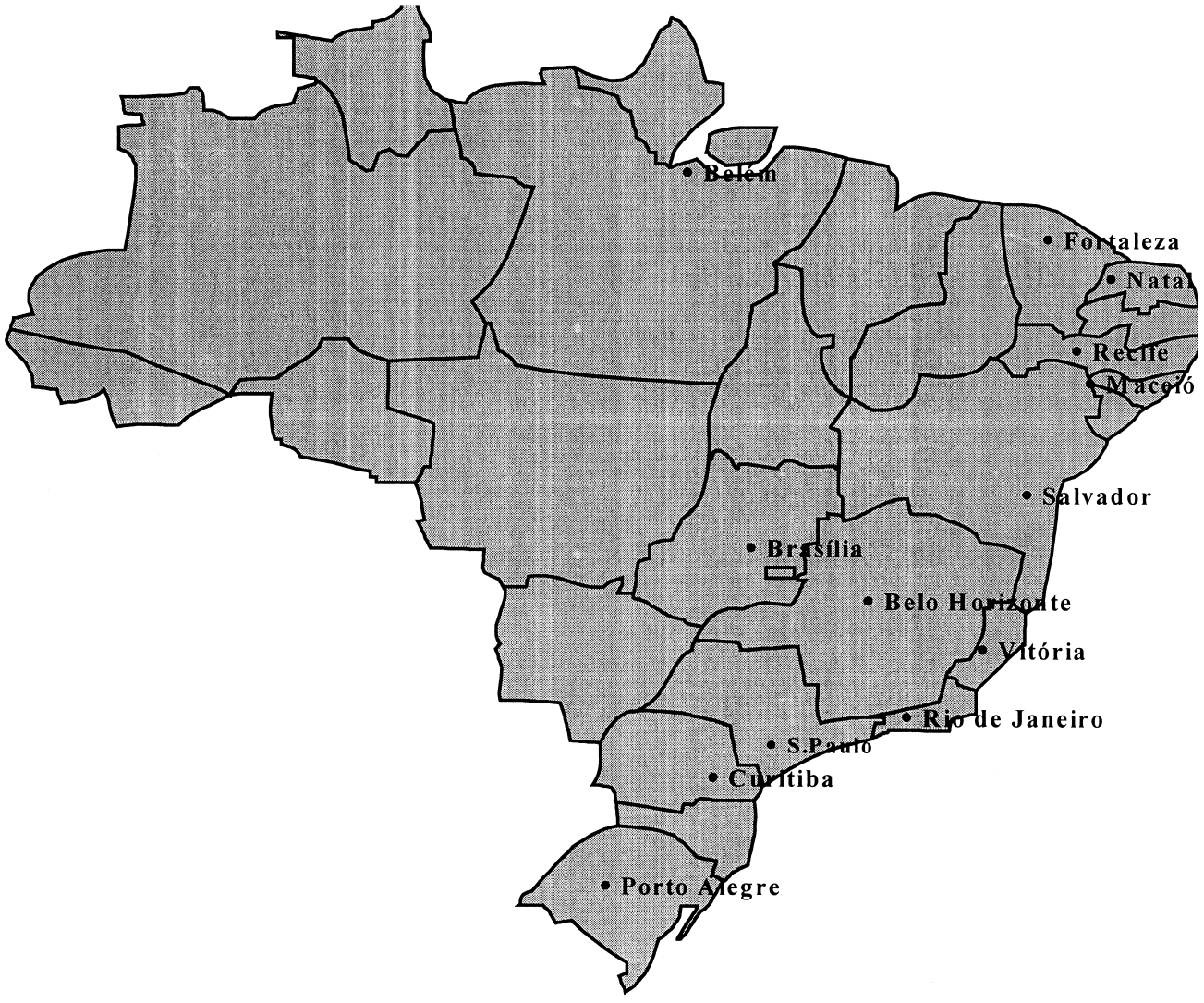

FIG. 2. Cities enrolled in the Brazilian National Survey on Hospital Nutritional Assessment study.

southern (Curitiba, Paraná) and central regions (Brasília and the Federal District) were less affected by malnutrition; prevalence rates were 38.9% and 34.8%, respectively. The northern parts of Brazil, in particular the Amazon Basin, were not included because of sparse populations and difficulty in obtaining health care. The more urbanized cities have greater access to health care. The average time spent performing the SGA was 9.1 ± 6.5 min.

The average length of stay before SGA was 18.8 ± 56.5 d (median, 8 d). Well-nourished patients were hospitalized for an average of 12.9 ± 38 d (median, 6 d), moderately malnourished patients were hospitalized for an average of 23.3 ± 73.3 d (median, 9 d), and severely malnourished patients were hospitalized for an average of 30 ± 62.9 d (median, 13 d; $P < 0.05$).

In contrast, only 33.2% of the patients evaluated within 2 d after hospital admission presented with some degree of malnutrition. In patients who were assessed between days 3 and 7, malnutrition was 1.5 times higher, with 44.5% of the patients being malnourished (OR = 1.58; 95% confidence interval [CI] = 1.31 to 1.91). Patients evaluated between days 8 and 15 had a two-fold increase in malnutrition rate (51.2%; OR = 2.07;CI = 1.71 to 2.52). A hospital stay equal to or longer than 15 d conferred a three-fold greater chance of being malnourished (61%; OR = 3.09; CI = 2.55 to 3.74; $P < 0.05$; Fig. 3). Patients with body mass indexes (BMIs) below 18 kg/m^2 also had longer hospital stays

TABLE III.

DEMOGRAPHICS OF PATIENTS IN THE BRAZILIAN NATIONAL SURVEY ON HOSPITAL NUTRITIONAL ASSESSMENT STUDY

Age (y)
Range = 18–90
Mean = 51.3 ± 18.0
Median = 52
Sex
54.4% male
45.6% female
Race
60.1 % white
17.7 % mixed
13.7 % black
12.9 % other
Education
22.6% illiterate
47.6% elementary (1–6 y)
16.6% junior high (7–8 y)
10.6% high school (9–12 y)
2.5% university (>12 y)

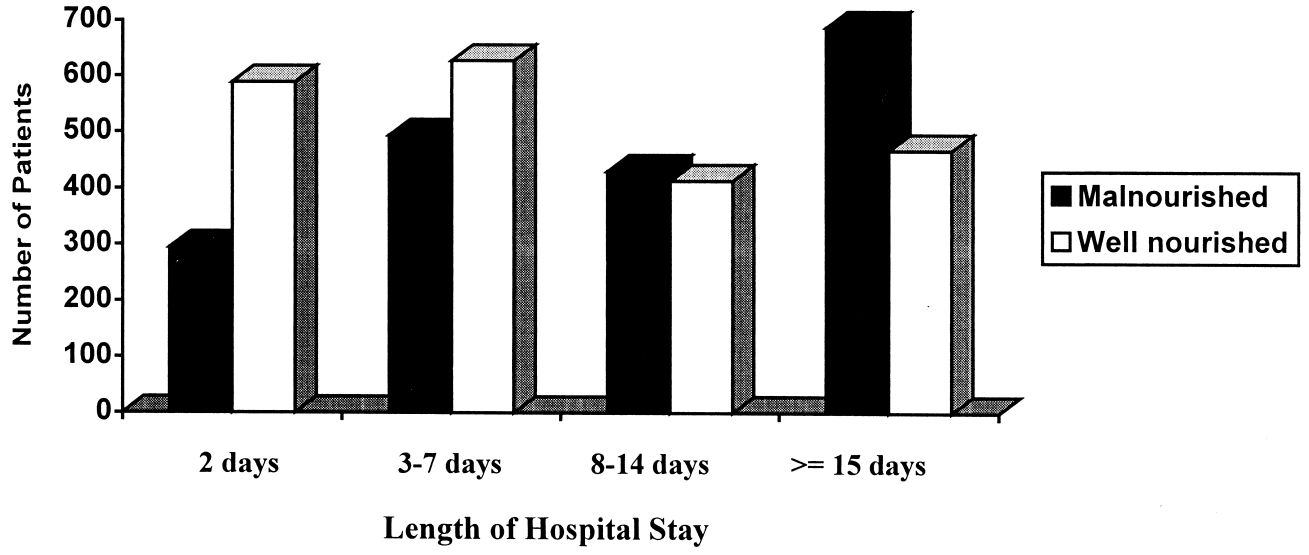

FIG. 3. Nutrition status of 4000 subjects (based on the Subjective Global Assessment Form) versus length of hospital stay.

(average = 21.7 ± 39 d versus 12.5 ± 27 d) when compared with those with BMIs higher than 18 kg/m^2 ($P < 0.01$).

Malnutrition and Age, Cancer, Infection, Disease, and Surgery

Table II shows the factors related to frequency of malnutrition. Thirty-six percent of the population was at least 60 y old. The older population was associated with a higher prevalence of malnutrition (52.8%) compared with those younger than 60 (44.7%; OR = 1.39; CI = 1.21 to 1.58; $P < 0.05$). Cancer patients had an almost three-fold higher malnutrition rate than non-oncologic patients (66.3% versus 42.9%; OR = 2.69; CI = 2.28 to 3.18; $P < 0.05$). Patients with infections had higher rates of malnutrition than those without infections (61.4% versus 38.8%; OR = 2.56; CI = 2.24 to 2.93; $P < 0.05$; Table II).

Variables that showed statistical significance in the univariate analyses were subjected to multivariate logistic-regression analysis, which showed that the variables age, cancer, infection, and length of stay were significant risk factors for malnutrition in this group of patients (Table IV).

Nutrition status also was influenced by the patients' diagnoses. Patients with autoimmune disease had the worst nutrition status (70.1% malnourished), followed by those with hematologic and respiratory diseases. Patients with sensory organ and musculoskeletal conditions were the least affected by malnutrition (Table V). Surgical patients had better nutrition status than medical patients (39% versus 57.2%; $P < 0.01$).

Nutrition Therapy

An evaluation of physicians' orders showed that 36.3% of patients were currently or had been fasting for an average of 2.6 ± 6.8 d. Oral commercial nutrition supplementation was used by only 4.0% of patients. A physician was directly responsible for diet orders and supplemental nutrition prescriptions in 22.9% of these cases. Dietitians provided oral nutrition supplements without a physician's order in 76% of cases. Enteral-nutrition therapy through a tube was used in 6.1% of patients, and 1.2% of patients received parenteral-nutrition therapy. Of the 48.9% malnourished patients, 10.1% received enteral nutrition. Enteral-nutrition therapy was used more in the southern states, where the prevalence of

TABLE IV.

MULTIVARIATE ANALYSIS OF VARIABLES CONSIDERED RISK FACTORS FOR MALNUTRITION

Variable	Category	Odds ratio	90% Confidence interval
Age (y)	>60 <60	1.2*	1.12–1.49
Cancer	Present Absent	3.7*	3.04–4.07
Infection	Present Absent	2.6*	2.19–2.99
Length of stay (d)	>15 <15	2.6*	2.14–3.22

* $P < 0.05$.

TABLE V.

PREVALENCE OF MALNUTRITION ACCORDING TO THE PRIMARY CONDITION OF THE PATIENT

Condition	Presence of malnutrition (%)
Autoimmune disease	70.1
Hematologic disorder	69.8
Respiratory condition	67.4
Gastrointestinal disorder	61.5
Metabolic disorder	59.6
Neurologic disorder	48.1
Genitourinary disorder	47.0
Cardiovascular disease	36.4
Trauma	27.7
Musculoskeletal disorder	22.9
Sensory-organ impairment	19.6
Others	49.8

hospital malnutrition was significantly lower than in the northern states.

Awareness of Nutrition Status

Awareness of nutrition status was reported in 18.8% of the medical records. Body weights at admission were recorded in only 15.1% of medical records, and usual body weights (body weights before illness were obtained by direct or indirect questioning) were recorded in 14.3%. Weight scales were available within 50 m of beds in 75% of cases. Heights were reported in only 20.3% of medical records. Serum albumin levels were recorded in 23.5% of medical records and total lymphocyte counts in 69%.

DISCUSSION

Brazil is the largest country in South America, the fifth largest country in the world, and approximately the size of the United States. The Brazilian population is approximately 160 million, distributed mainly along the eastern coastal regions. The gross national product is estimated at 805 billion dollars, but there are large economic and geographic differences in the distribution of wealth. Northern and northeastern regions are significantly poorer than southern and southeastern regions. Health care is provided primarily by SUS, with an annual budget of 19 billion dollars. SUS relies on its own hospitals and on university, philanthropic, and private hospitals to provide care for its patients. In Brazil, there is a severe shortage of hospital beds and funds for health care, making it essential to find ways to decrease complications and length of stay to reduce costs.[30]

The practice of clinical nutrition in Brazil, as in most countries, is the responsibility of physicians. However, as also reported in the literature,[31,32] medical nutrition education for physicians is rare. Often, it is confined to general topics taught in the initial years of medical school.

Hospital malnutrition can result from limited socioeconomic resources, medical conditions (the disease per se), not recognizing the patient's nutrition needs, and lack of prescriptions for nutrition therapy. The IBRANUTRI is the first multicenter nutrition assessment study of such a large scale. Although the size of IBRANUTRI is exceptional, its results are consistent with the findings of other nutrition-assessment studies in the United States and elsewhere. In the United States, Tucker and Stanley[31] found that 94.4% of 2485 patients had one or more risk factors for malnutrition. In Europe, Naber et al.[33] found malnutrition in 45% of internal-medicine and gastrointestinal patients, and McWhirter and Pennington[34] found malnutrition in 40% of patients.[5] Despite the many available tools for nutrition assessment and therapeutic advances, there has not been much change in the rate of malnutrition in the past 25 y, except possibly in the recent literature.[35]

The heterogeneity of our sample allowed us to consider regional, social, and economic differences. Our overall results showed malnutrition levels comparable to those of well-developed countries.[5,6,24,31,33,34,36,37] Our results also suggested that physicians' lack of awareness of nutrition needs is as significant as socioeconomic differences and other risk factors as a cause of hospital malnutrition and might explain the increase in malnutrition associated with longer hospital stays.

Epidemiologists have defined a common disease as one with a prevalence rate greater than 10%.[38] Malnutrition, which is defined as a disease by the International Code of Diseases 260-269, therefore would be the most common disease in Brazilian hospitals, with a prevalence rate of 48.1%.

Hospital malnutrition has been related to a relatively high incidence of complications, mortality, and longer hospital stays.[1–4] In this study, malnutrition correlated with advanced age ($\geq$60 y) and the presence of cancer and infection. In addition, patients became more malnourished as a function of length of hospital stay, even though other risk factors might have contributed to this.

The best method for conducting nutrition assessment remains controversial. IBRANUTRI assessed nutrition status with the SGA as described by Detsky et al.[29] who reported a concordance level above 80% among investigators. In the pilot IBRANUTRI study,[27] we obtained a concordance level of 89% among different investigators. In the pilot study, the investigators performing nutrition assessments were not nutrition experts (nurses, nutrition students, and medical residents) and did not have experience performing the SGA. Those investigators were specifically trained in a 2-d session by one of us (M.I.T.D.C.) to perform the SGA, so it was deemed suitable for use by the many multidisciplinary teams in different parts of Brazil. Training of each team resulted in interteam standardization. Throughout the study, all nutrition-assessment protocols were checked by the local coordinator and by one of us (M.I.T.D.C.) before entering data into the database to check discrepancies between the data collected and the nutritional diagnosis. Although the SGA was developed to assess nutrition status within 48 h of admission, we used it after having trained all the interviewers to consider changes in body weight, gastrointestinal symptoms, eating habits, and functional capacity before hospital admission. The SGA is a non-invasive, inexpensive, sensitive, and specific assessment tool. Anthropometric measurements such as skinfold thickness, midarm circumferences, and BMI can measure body composition but only indirectly assess nutrition status. Anthropometric measurements and their comparative parameter tables developed by Frisancho[15] and Jellife[39] were developed from studies of healthy populations and thus might not be appropriate for sick patients. In this study we showed an association between low BMI and low serum albumin with malnutrition according to the SGA in those patients for whom data were available. The SGA when used with information on weight loss and serum albumin levels has been considered a cost-effective means of nutrition assessment.[40,41] Our experience indicates that SGA might be the best method for initial nutrition assessment because of the rapidity of the assessment, ease of training, and validity of the tool.[27,29]

Nutrition therapy (parenteral, enteral, or oral) is indicated for the treatment and prevention of nutrition deficiencies or imbalances.[10,13] In general hospitals, some have estimated that at least 10% to 15% of patients should receive some form of nutrition therapy. Results from the IBRANUTRI study were expected to show that a large number of patients received nutrition therapy because of the high prevalence of malnutrition. However, results showed that only a small minority of patients were being treated, suggesting that malnutrition is either not recognized or not viewed as clinically significant. Roubenoff et al.[32] reported that a hospital staff initially identified only 12.5% of patients as being malnourished. During the postnutrition education period of 4 h, they recognized 100% of patients at risk for malnutrition. These results demonstrate the efficacy of educating hospital staff about malnutrition.

The results from this study confirmed that nutrition awareness is the exception and not the rule in the hospital setting,[32] because only 18.8% of the patients' records had any reference to nutrition status. Similar results were found by McWhirter and Pennington[34] who showed that only 100 of 200 (50%) malnourished patients' records included information about their nutrition status.

Although medical progress leads to more advanced and sophisticated technology, in the process it can neglect fundamental biological concepts such as the importance of malnutrition on a patient's evolution. Nightingale et al.[42] and Reilly et al.[43] advocated implementing risk-screening tools as a possible way to reduce complications related to malnutrition. Providing individualized nutrition therapy to patients is critical to preserving immune function and metabolic equilibrium.[44]

In recognition of the high prevalence of malnutrition in hospitals, graduate and postgraduate educational programs should offer

classes covering nutrition science and clinical nutrition. According to Gallagher et al.,[45] lack of nutrition education is a major contributing factor to a high prevalence of malnutrition, particularly in patients staying for longer periods in the hospital.

The SBPNE, founded in 1975, is composed of 1500 members representing all types of health care professionals. SBPNE has sought to raise awareness among health care professionals to provide basic education about hospital malnutrition and nutrition therapy. Until recently, these objectives were hindered by numerous obstacles such as the lack of enthusiasm by physicians, the absence of specific legislation on parenteral and enteral nutrition, misleading ideas about the cost of nutrition intervention, and irregular reimbursement for the health care practitioners providing nutritional consultations. Through the results of the present study, SBNPE hoped to achieve its goals. Whatever assessment methodology is applied, the quality of medicine in Brazil is likely to improve as more hospitals in the country form nutrition teams that are responsible for teaching doctors and other professionals about nutrition assessment and interventions. This should be an example to other countries.

CONCLUSIONS

The SBPNE launched a strategic plan to reduce the high prevalence of malnutrition stemming in part form the low level of physician awareness. Through the initiative of the Brazilian Public Health Department and in cooperation with several members of various health care professions and the SBPNE, the rules for preparation and use of parenteral- and enteral-nutrition therapies in the hospital setting were published.[46,47] According to those new rules, hospitals are required to maintain a formally appointed, multidisciplinary, nutrition support team composed of physicians, nurses, dietitians, and pharmacists to provide parenteral- and enteral-nutrition therapies. This nutrition support team has the responsibility to perform nutrition assessments on hospitalized patients and verify that parenteral and enteral procedures are performed according to the National Health Department laws. In addition, the SBPNE has been giving introductory courses on basic clinical nutrition to general physicians throughout the country. From November 1997 to May 1999, a course on total nutrition therapy[48] introduced 290 physicians to the basics of parenteral and enteral nutrition and trained them to perform nutrition assessments and initiate nutrition therapy. Such initiatives have shown that education is the key to stressing the importance of nutrition education among health care professionals.

The IBRANUTRI study met the objective of showing the relation between malnutrition, admission diagnosis, age, socioeconomic factors, and medical awareness in a cross-section of Brazilian hospitals. Observation of selected patients with regard to the role of malnutrition in clinical outcomes (morbidity and mortality) is the aim of a future study.

In conclusion, the prevalence of malnutrition was high in hospitalized patients in Brazil. The presence of infection and cancer and advanced age ($\geq$60 y) were risk factors for malnutrition. Malnutrition rate increased with longer hospital stays. Most doctors were unaware of the nutrition status of their patients. The SGA can be used successfully by different health care professionals to assess malnutrition.

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