Nutrition Status and Length of Hospital Stay

21

Vania Aparecida Leandro-Merhi, José Luiz Braga de Aquino, and Maria Rita Marques de Oliveira

Contents

Abstract

The length of hospital stay reflects the response to treatment, which in turn is directly influenced by the patient's nutritional status. Although the reported prevalences of hospital-associated malnutrition vary greatly depending on practice and assessment instrument, the association between malnutrition and length of stay is consistent and has always been confirmed by studies that aimed to investigate this association. Longer hospital stays can be avoided by performing a thorough screening and monitoring of the patient's nutritional status, along with early introduction of nutritional therapy to correct existing deficiencies. This measure is not taken very often, but its need is recognized.

List of Abbreviations

BMI	Body mass index
MNA	Mini Nutritional Assessment
MUST	Malnutrition Universal Screening Tool
NRS-2002	Nutritional Risk Screening 2002
NST	Nutrition screening tool
SGA	Subjective Global Assessment
SGA/PG-SGA	Patient-generated SGA adapted from the SGA specifically for cancer patients

V.A. Leandro-Merhi (✉)
School of Nutrition, Pontifical Catholic University of Campinas-SP-Brazil, Campinas, SP, Brasil
e-mail: valm@dglnet.com.br; valm@puc-campinas.edu.br

J.L.B. de Aquino
School of Medicine, Surgery Department, Pontifical Catholic University of Campinas-SP-Brazil, Campinas, SP, Brasil
e-mail: jlaquino@sigmanet.com.br

M.R.M. de Oliveira
School of Nutrition, Unesp-Botucatu-SP-Brazil, Botucatu, SP, Brasil
e-mail: mrmolive@ibb.unesp.br

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Introduction

The hospital is the best-prepared place to provide patient care; it is where highly complex treatments and life support can be found when life is at risk. Paradoxically, a longer-than-necessary hospital stay does not please the patient or the health-care team and increases costs, whether public or private. This is not all. Hospital stay itself is a risk factor for infection, other health hazards, and the patient's well-being, justifying investments on measures that improve care and reduce length of stay. These arguments are also valid for hospital discharges or for the transfer of patients from an intensive care unit to a semi-intensive care unit or a clinic.

The decision to hospitalize, treatment of choice, and best time to discharge are subjective attributions that vary between physicians, practices, and schools, among others, despite the existence of guidelines. Nevertheless, the factors that influence length of stay basically have a universal character and involve the treatment proposed. From the earliest times, diet has been associated with body nourishment and health because these provide the energy and vitality necessary to overcome disease, that is, to respond well to treatment.

Nobody questions the fact that a well-nourished body responds better to treatment, but evidencing this fact is not so easy because the relationship between nutritional status and disease is very complex. For example, disease has a negative impact on nutritional status. Consequently, patients in advanced disease stages or who require more sophisticated care and longer hospital stays are usually malnourished. Assessment of the effect of nutritional status on length of stay, herein understood as response to treatment, demands strict control of the study variables, usually through multivariate statistical approaches.

Nutritional status is another factor that deserves much attention in this discussion. There is no gold standard for the nutritional assessment of hospitalized patients, so regardless of the assessment tools or indicators used, there will always be a somewhat theoretical cutoff point established through the choice of convenient specificities and sensitivities. Ultimately, these cutoff points will divide the population into nourished and malnourished individuals. Notwithstanding, these tools have proven capable of classifying patients according to their need of care, reducing the risk of a poor response to treatment. Hence, the objective of this chapter is to review the process of malnutrition in the hospital setting and its association with length of stay and to discuss how nutrition-related actions can help to reduce length of stay.

Hospital-Associated Malnutrition

Before approaching nutritional status and its influence on length of stay, it is important to discuss hospital-related malnutrition and its intercurrences. Malnutrition and its influence on the morbidity and mortality of hospitalized clinical, surgical, and other patients have long been recognized by many authors and hospitals throughout the world (Mcwhirter and Pennington 1994; Stratton et al. 2004; Pirlich et al. 2006; Correia and Waitzberg 2003; Kyle et al. 2004). The mortality rate of patients submitted to elective peptic ulcer surgery has been established long ago, together with the fact that their mortality increased significantly if they had lost more than 20 % of their body weight, especially if this loss occurred before surgery (Studley 1936). Since then, malnutrition in this population has been exhaustively studied and documented, and many studies have reported mortality rates ranging from 28 % to 50 % (Corish and Kennedy 2000; Mcwhirter and Pennington 1994; Kruizenga et al. 2005) in patients who are malnourished on hospital admission. A British study done by Stratton et al. (2004) found that the risk of malnutrition in hospitalized patients varied from 19 % to 60 %, and another study in Germany found that malnutrition affected 27.4 % of hospitalized patients (Pirlich et al. 2006). Hospitals are not only a high-risk environment for malnutrition but also gather patients who are very vulnerable to it, justifying its high rates and the efforts made to develop preventive measures that enable a fast recovery of nutritional status.

Table 1 Prevalences of malnutrition in the hospital setting since 2000

Practice	Population	Rates of malnutrition	Country	Reference
Clinical and surgical practices	$N = 850$	20 %	England	Edington et al. 2000
Internal medicine	$N = 4{,}000$	48.1 %	Brazil	Waitzberg et al. 2001
General medical practices	$N = 750$	22 %	Denmark	Kondrup et al. 2002
General medical practices	$N = 1{,}000$	47 %	Argentina	Wyszynski et al. 2003
General medical practices	$N = 1{,}886$	27.4 %	Germany	Pirlich et al. 2006
Clinical and surgical practices	$N = 29.139$	15 %	Turkey	Korfali et al. 2009
General medical practices	$N = 1{,}274$	46.6 %	Italy	Caccialanza et al. 2010
Internal medicine	$N = 32.837$	18.2 %	Switzerland	Imoberdorf et al. 2010
Clinical and surgical practices	$N = 1{,}144$	9.7 %[a]	Portugal	Amaral et al. 2010
		36 %[b]		
General medical practices	$N = 350$	14.1 %	Brazil	Leandro-Merhi et al. 2011
Clinical and surgical practices	$N = 3{,}122$	32 %	Australia	Agarwal et al. 2013
Clinical and surgical practices	$N = 796$	28.9 %	Spain	Burgos et al. 2012
Clinical and surgical practices	$N = 818$	29 %	Singapore	Lim et al. 2012

[a]Malnourished
[b]Risk of malnutrition

Importantly, the prevalence of nutritional risk in most hospitals varies from 15 % to 60 % (Korfali et al. 2009; Westergren et al. 2009; Filipovic et al. 2010; Amaral et al. 2010; Sorense et al. 2008), and three recent studies show that this situation has not changed. A study done in Italy reported that 46.6 % of the study hospitalized patients were at nutritional risk (Caccialanza et al. 2010). A study in Spain found prevalences of mild, moderate, and severe malnutrition of 50.7 %, 26.4 %, and 5.7 %, respectively (Cabello et al. 2011). In Brazil, current data show that 14.1 % of the patients are malnourished on hospital admission (Leandro-Merhi et al. 2011). The variation in the prevalences of hospital-associated malnutrition may be influenced by the type of nutritional assessment method used and, obviously, by the study population, their clinical conditions, location, and hospital characteristics (Filipovic et al. 2010; Beghetto et al. 2008, 2009; Raslan et al. 2008; Pereira Borges et al. 2009). Table 1 shows the different rates of malnutrition in hospitalized patients from different practices and countries since 2000.

These studies have clearly shown that, even today, the nutritional status of hospitalized patients is often poor on admission and continues to deteriorate during their stay. Mapping the magnitude of this situation has shown the consequences of malnutrition and its impact on morbidity, mortality, length of stay, hospital costs, and complication rates, among others (Table 2). In surgical patients, poor nutritional status is

Table 2 Clinical outcomes of malnourished, hospitalized patients

Consequences	Reference
Longer hospital stay	Edington et al. 2000; Correia and Waitzberg 2003; Pirlich et al. 2006; Marco et al. 2011; Lim et al. 2012; Burgos et al. 2012; Agarwal et al. 2013; Lee et al. 2013
Frequent readmissions	Lim et al. 2012; Agarwal et al. 2013
Higher hospital stay cost	Correia and Waitzberg 2003; Amaral et al. 2007; Marco et al. 2011; Lim et al. 2012; Freijer et al. 2013
Higher mortality	Correia and Waitzberg 2003; Marco et al. 2011; Lim et al. 2012; Burgos et al. 2012; Agarwal et al. 2013; Lee et al. 2013
Higher disease severity	Edington et al. 2000
Higher incidence of complications	Correia and Waitzberg 2003; Schiesser et al. 2008; Ocón Bretón et al. 2012

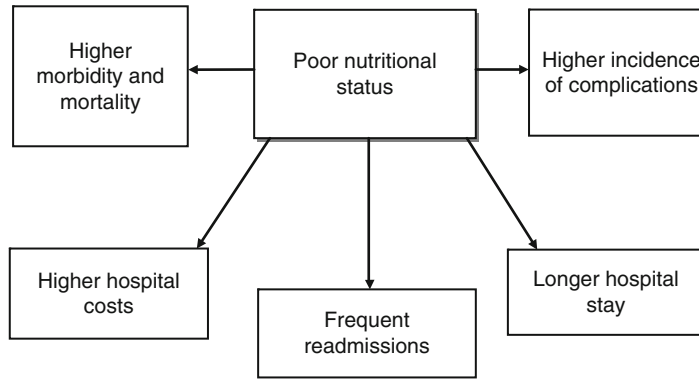


Fig. 1 Clinical outcomes of malnourished patients

associated with higher postoperative complication rates, longer stays, and higher morbidity and mortality (Sungurtekin et al. 2004; Schiesser et al. 2008). Additionally, the vulnerability of this population in the postoperative period is known because of their poor preoperative nutritional status. Patients who are losing weight are particularly vulnerable, because they are more susceptible to postoperative complications (Putwatana et al. 2005; Sungurtekin et al. 2004; Gil-Rendo et al. 2006).

In general, clinical and surgical patients are exposed to many risk factors that promote hospital-associated malnutrition, such as changes in the digestive tract, inadequate nutrient and energy intakes, and other factors associated with the clinical course of the illness. In addition to the nutritional perspective, the prognosis of surgical patients may be even worse because of the long fasting periods imposed before and after surgery and other complications related to gastrointestinal surgeries. The literature has shown conflicting data about malnutrition in surgical and nonsurgical patients (Correia and Waitzberg 2003; Gutiérrez et al. 2007; Pacelli et al. 2008).

Some determinants of hospital-associated malnutrition are the clinical and nutritional condition of the patient, factors associated with the hospitalization process, and, especially, the absence of personalized nutritional therapies during stay (Pirlich et al. 2006; Amaral et al. 2010; Waitzberg and Correia 1999; Norman et al. 2008).

Braunschweig (1999) studied the relationship between nutritional status and cost of stay and found that patients who become malnourished during their stay have relatively more complications than those who do not, such as infections (19 %) and disease-related complications (62 %), increasing hospital expenditures. The stays of these patients were also longer, totaling 19 days or more (Braunschweig 1999). Other studies have also reported the higher hospital costs associated with malnutrition, in addition to its prognostic implications (Marco et al. 2011).

Given the magnitude of the problem caused by malnutrition in the hospital setting and that malnutrition is associated with higher morbidity (Correia and Waitzberg 2003), higher mortality (Correia and Waitzberg 2003; Lee et al. 2013; Lim et al. 2012), higher incidence of complications (Correia and Waitzberg 2003), longer hospital stays (Caccialanza et al. 2010; Correia and Waitzberg 2003; Lee et al. 2013; Lim et al. 2012), higher hospital costs (Correia and Waitzberg 2003; Norman et al. 2008; Lim et al. 2012), and frequent readmissions (Lim et al. 2012), there is an urgent need to develop nutritional diagnosis and intervention strategies that reduce the number of clinical outcomes associated with poor nutritional status and its implications (Fig. 1).

The length of time a patient needs a hospital bed, general care, or intensive care depends on multiple factors, in addition to those associated with the type of disease and patient's condition. For instance, in public hospitals, such factors include the admission policies and availability of hospital beds and funds. Furthermore, the ability of the family to provide home care affects the

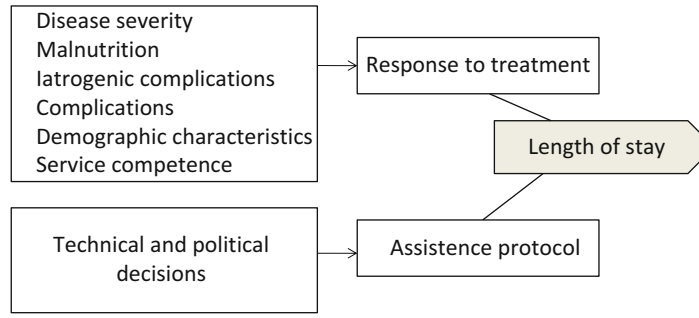


Fig. 2 Determinants of the length of hospital stay

decision to discharge, or the resources available in the nursing ward, including trained personnel, influence the decision to transfer a patient from the intensive care unit to the nursing ward. Professionals use guidelines to decide whether an individual requires a hospital bed or is ready for discharge, but one must bear in mind that such decisions are also based on important subjective components.

Ultimately, the decision to admit and the length of stay are determined by disease severity and the specificities of the care required. Disease type and stage determine its severity, which in turn is influenced by nutritional status and other factors, such as age. Length of stay is related to factors inherent to the disease, the patient's conditions, and the cause of hospitalization. Figure 2 summarizes the determinants of hospital stay. One side shows the time required for the patient to respond to treatment, which is influenced not only by disease severity and nutritional status but also by demographic variables (age, life habits, etc.) and disease-related complications, which may or may not be iatrogenic. Response to treatment also appears to be influenced by the competence of the staff and availability of technological resources, including the admission and discharge protocols. These factors determine the response to treatment. Length of stay is also a political decision defined by the assistance protocols. This political decision depends on the operational conditions and service organization of the hospital and on the scientific evidences of the patient's status, among others. These considerations indicate that length of stay will always be relative.

Association Between Nutritional Status and Length of Hospital Stay

For many years, the pertinent literature has shown that poor nutritional status in hospitalized patients may affect the clinical course of the disease, morbidity, and mortality (Lee et al. 2013; Lim et al. 2012), and many recent studies show that malnourished patients have longer stays (Caccialanza et al. 2010; Lee et al. 2013; Lim et al. 2012). In other words, an association has been made between nutritional status and length of stay. Since nutritional status can be assessed and diagnosed by many instruments, malnutrition indices may vary greatly. Pirlich et al. (2006) performed a classical study in German hospitals using the Subjective Global Assessment (SGA) method and found a rate of malnutrition of 27.4 %, which was strongly associated with the length of stay, showing that malnourished patients have longer stays than nourished patients (more than 40 %, with $p < 0.0001$). This same study also reported an association between small mid-upper arm muscle area and longer stay, contrary to BMI, which was a poor predictor of length of stay, showing no association.

Kyle et al. (2004) assessed more than 1,270 patients in Geneva and Berlin to determine if serum albumin or moderate and severe nutritional depletion according to the nutritional risk index (NRI) were associated with longer stays. They showed that severe nutritional depletion according to the NRI was associated with length of stay. In a recent study which assessed the impact of malnutrition on length of stay, Lim et al. (2012) found that malnourished patients

have longer stays than nourished patients (6.9 ± 7.3 days versus 4.6 ± 5.6 days, $p < 0.001$). The lengths of stay of malnourished patients were 1.5 times longer than those of nourished patients. In Brazil, studies have also found that malnourished patients have longer stays (Leandro-Merhi et al. 2011; Correia and Waitzberg 2003). The factors that contribute to shorter stays, considered protective factors, are the absence of complications, absence of cancer, and absence of malnutrition (Correia and Waitzberg 2003).

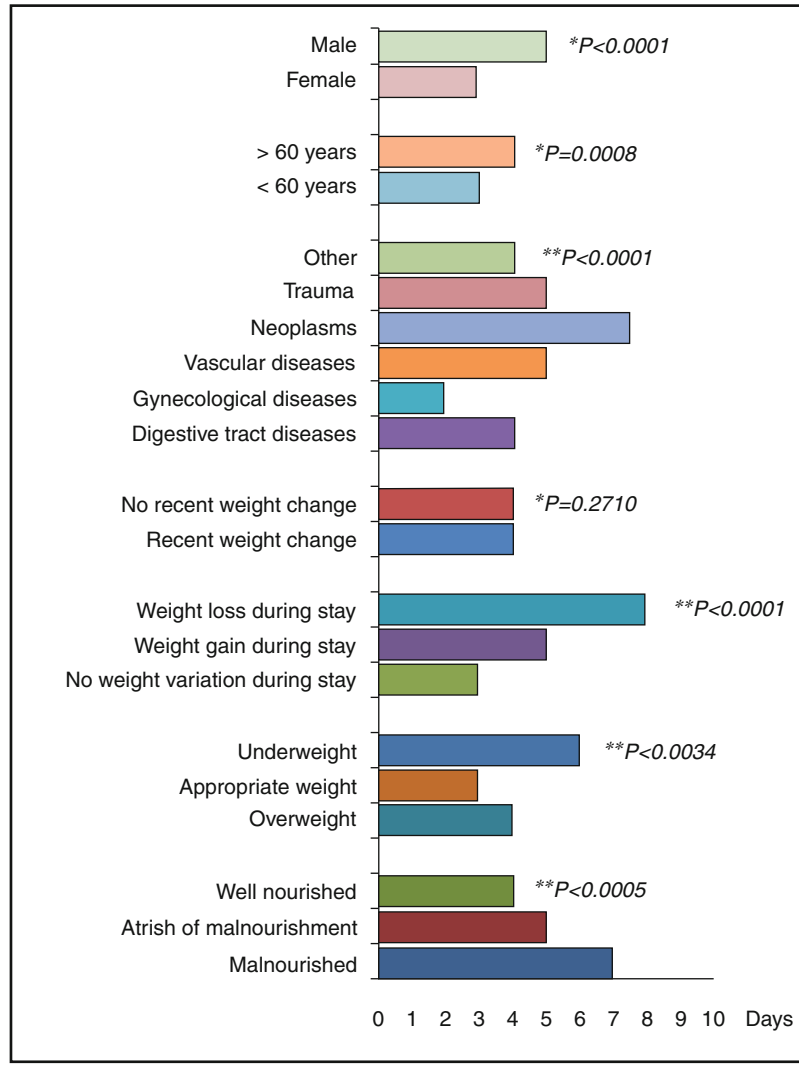
Recently, Lee et al. (2013) used the nutrition screening tool (NST) to assess nutritional risk on admission and its effect on the length of stay and mortality of gastrointestinal cancer patients and found that patients at high nutritional risk had significantly longer stays than those at low risk (10.4 ± 11.4 days versus 7.7 ± 7.9 days, $p < 0.0001$). In-hospital mortality differed significantly among the three groups of patients: 1.5 % for those at low nutritional risk, 4.7 % for those at moderate nutritional risk, and 13.6 % for those at high nutritional risk, which was also associated with longer stays and high mortality.

In Brazil, Leandro-Merhi et al. (2011) found that males ($p < 0.0001$), patients aged 60 years or more ($p = 0.0008$), cancer patients ($p < 0.0001$), patients who lost weight during their stay ($p < 0.0001$), and underweight patients characterized by low BMI ($p = 0.0034$) had longer stays (Fig. 3). When length of stay was compared with the nutritional status of adults according to the SGA and of the elderly according to the Mini Nutritional Assessment (MNA), malnourished patients had significantly longer stays (10.1 ± 8.7 days, $p = 0.0005$). The abovementioned study also found that disease was the factor that most impacted the length of stay of the study population. Still on the same study, disease and poor nutritional status according to the SGA were associated with the length of stay of patients aged less than 60 years, and after multiple regression analysis, the authors also found that poor nutritional status according to the MNA or SGA was the risk factor that most impacted the length of stay of patients with digestive tract diseases. Mid-upper arm circumference was a determinant risk factor of the length of stay of cancer patients (Leandro-Merhi et al. 2011). A similar finding was reported by another Brazilian study that identified mid-upper arm circumference as an indicator of longer stays in women, and triceps skinfold thickness as the best predictor of length of stay; the said study also found that length of stay was associated with disease, gender, age, and nutritional status (Valente da Silva et al. 2012).

This same study (Leandro-Merhi et al. 2011) found that patients with malignant diseases had the highest prevalence of underweight of all hospitalized patients (Fig. 4). Body weight is a very specific indicator of nutritional status, and as shown by Fig. 3, underweight was associated with longer stays – underweight patients were in the hospital for twice as long as other patients. However, body weight is not a very sensitive indicator because when this same population was assessed by the SGA, multivariate Cox regression showed that malnourished individuals were 3.3 times more likely to have longer stays than nourished individuals (Leandro-Merhi et al. 2011). This information reinforces the importance of including instruments that assess nutritional status subjectively in the care protocols of hospitalized patients, especially of critical care patients, because of the operational and interpretative difficulty of obtaining certain anthropometric data, as hydration status also affects body weight.

Malnourished patients hospitalized in Australian and New Zealander hospitals also had longer hospital stays (15 days versus 10 days, $p < 0.0001$) and readmission rates (36 % versus 30 %, $p = 0.001$) than nourished patients (Agarwal et al. 2013). It is important to bear in mind that some studies reporting associations between nutritional status and length of stay used multiple logistic regression (Pirlich et al. 2006; Caccialanza et al. 2010; Leandro-Merhi et al. 2011; Correia and Waitzberg 2003; Lim et al. 2012), which reduces the impact of other variables on the results.

An Italian study that investigated nutritional parameters associated with longer stays found

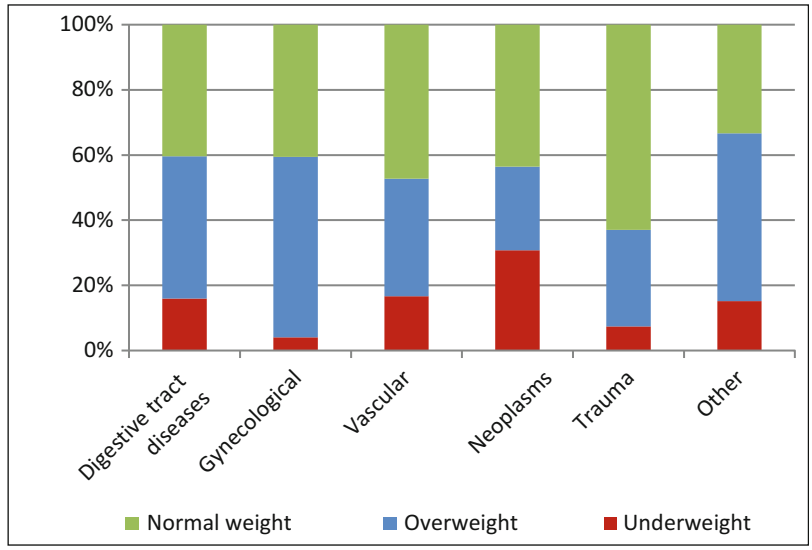


* MMann-Whitney test; ** Kruskal-Wallis test

Fig. 3 Length of hospital stay and its relationship with gender, age, type of disease, recent weight change, weight loss during stay, and nutritional status (Adapted from Leandro-Merhi et al. 2011)

that patients with longer stays, that is, 3 days or more, presented an unintentional weight loss before and after hospital admission equal to 5 % or more of their body weight and higher rates of mortality, underweight, and nutritional risk (Caccialanza et al. 2010). However, this population also had higher rates of severe diseases, malignant diseases, and comorbidities and underwent a higher number of medical procedures. Patients with stays shorter than 3 days were less likely to have severe diseases, required fewer interventions, and were at lower nutritional risk than those with longer stays. Finally, Caccialanza et al. (2010) found a significant, independent association between malnutrition on admission and longer stays: malnourished patients on admission were 65 % more likely to require a longer stay, even after adjusting for multiple risk factors in multivariate analysis.

Gupta et al. (2011) performed a very interesting systematic review where they investigated the ability of nutritional status to predict the length of stay of cancer patients. The authors reviewed studies that used different methods, namely, SGA,



p = 0.005 according to the chi-square test

Fig. 4 Distribution of nutritional status according to type of disease (Adapted from Leandro-Merhi et al. 2011)

BMI, serum albumin, NRS, and MUST, among others, to determine nutritional status and its relationship with length of stay. They found that SGA/PG-SGA is a better predictor of the length of stay of surgical patients with gastrointestinal cancer than of nonsurgical patients with the same disease and concluded that treating malnutrition could reduce length of stay and, perhaps, rate of readmission. According to Almeida et al. (2013), of the various methods available for assessing nutritional risk or malnutrition, only BMI and triceps skinfold thickness were unable to predict longer stays. Meanwhile, the Nutritional Risk Screening 2002 (NRS 2002) (Kondrup et al. 2003) can be considered a good indicator of length of stay and a powerful indicator of complication incidence and severity (Schiesser et al. 2008). Raslan et al. (2010, 2011) recently recommended the NRS-2002 for predicting the clinical outcomes of hospitalized patients.

Table 3 lists some studies that found associations between malnutrition or nutritional risk and longer hospital stays. All studies showed that malnutrition leads to longer hospital stays, regardless of assessment method. This is very important information endorsed by ample scientific evidence. It indicates the need of constantly investing in new strategies to fight hospital-associated malnutrition.

Applications to Critical or Intensive Care

Intensive care patients are more vulnerable to malnutrition because of their usually higher metabolic requirements, frequent food intake difficulty or inability, and often abnormal metabolic and hemodynamic functions. These factors place critical care patients at high risk of malnutrition and make them possible candidates for aggressive nutritional interventions. There are no data in the literature that allow an accurate estimate of the impact of nutritional intervention on length of stay because of the complex relationship between disease and nutritional status. However, the evidences presented in this chapter show the unquestionable importance of nutritional therapy in the hospital setting for reducing the length of stay in the hospital and intensive care unit, that is, for optimizing treatment.

Applications to Other Conditions

Poor nutritional status always affects response to treatment in a negative way, resulting in longer hospital stays. This chapter shows that the prevalence of malnutrition varies greatly but that it is

Table 3 Longer hospital stay associated with malnutrition determined by different nutritional assessment methods

Nutritional status assessment method	Study population	LOS without malnutrition (days)[a]	LOS with malnutrition (days)[b]	P-value	Reference/year
Anthropometry	$N = 850$	5.7	8.9	<0.01	Edington et al. 2000
Anthropometry	$N = 750$	–	9	<0.0001	Kondrup et al. 2002
SGA	$N = 9,348$	–	>14	<0.05	(Correia and Campos 2003)
SGA	$N = 709$	10.1	16.7	<0.05	Correia and Waitzberg 2003
Nutritional risk index	$N = 1,273$	–	≥11	<0.005	Kyle et al. 2004
SGA	$N = 1,886$	–	15[c]/17[d]	<0.001	Pirlich et al. 2006
MUST	N = 150	15	24[c]/28[d]	0.02	Stratton et al. 2006
NRS	$N = 608$	4	10	<0.001	Schiesser et al. 2008
Nutritional risk index	$N = 1,274$	7	13	<0.001	Caccialanza et al. 2010
SGA	$N = 350$	5.7	10.1	.0005	Leandro-Merhi et al. 2011
SGA	$N = 818$	4.6	6.9	0.001	Lim et al. 2012
Anthropometry: BMI	$N = 278$	14.5	17.04	0.067	Valente da Silva et al. 2012
Mid-upper arm circumference		14.1	17.29	<0.05	
Nutrition screening tool	$N = 4,345$	7.7	7.9[c]/10.4[d]	<0.0001	Lee et al. 2013
SGA and BMI >18.5 kg/m^2	$N = 3,122$	10	15	<0.0001	Agarwal et al. 2013

[a]Length of hospital stay (LOS) in patients without malnutrition, nutritional risk, or with low nutritional risk
[b]Length of hospital stay in patients with malnutrition determined by different nutritional assessment methods
[c]Moderate risk or malnutrition
[d]Severe malnutrition or high risk

always present. Concurrently, longer hospital stays were always associated with malnutrition, regardless of the assessment tool used or the characteristics of the target population.

Guidelines and Protocols

The information provided in this chapter clearly evidences that hospitals need to develop effective strategies for diagnosing and controlling hospital-associated malnutrition from admission and that nutritional diagnosis should be done preferably within the first 24 or 48 h of hospital stay. Additionally, nutritional status must be monitored throughout the stay. The desired results depend on the development of protocols appropriate for the service provided by the hospital and the resources available.

It must be highlighted that some methods only identify the patients at nutritional risk, while others classify the patient's nutritional status and allow its monitoring. Hence, hospital-associated malnutrition can be systematically identified by medical/nutritional care routines as follows:

(A) Nutritional screening and assessment using any of the already existing methods within the first 48 h of hospital admission.

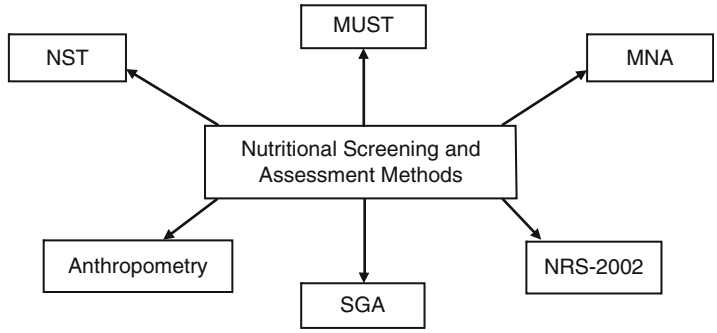


Fig. 5 Nutritional screening and assessment methods. *Anthropometry* weight, height, body mass index, circumferences, and skinfold thicknesses, *SGA* Subjective Global Assessment, *NRS-2002* Nutritional Risk Screening-2002, *MUST* Malnutrition Universal Screening Tool, *MNA* Mini Nutritional Assessment, *NST* Nutrition screening tool

(B) Development of a computer program for the notification of the nutritional status of patients in the hospital (Marco et al. 2011) and concomitant inclusion of the patients' current nutritional status in their medical records.
(C) Early nutritional intervention performed by a multidisciplinary team with dieticians, physicians, nurses, and physiotherapists, among others.
(D) Periodical reassessment (daily or every other day) of the patients at nutritional risk for the maintenance or review of the ongoing nutritional conducts. Critical care patients are automatically considered at nutritional risk.

Nearly all nutritional diagnosis methods can be included in the daily clinical care routine of hospitalized patients (Beghetto et al. 2008; Raslan et al. 2008, 2010, 2011). However, a consensus about which nutritional screening methods are best for the identification of malnourished patients or those at nutritional risk does not exist (Fig. 5). This chapter discussed many studies that used these different instruments to diagnose or monitor the nutritional status and clinical outcomes of hospitalized patients. The versatility and gratuitousness of the NRS-2002 make it a better predictor of the clinical outcomes of hospitalized patients, with the added advantage that it can be administered to all patients, regardless of their age or disease (Raslan et al. 2010, 2011). Figure 5 summarizes the standard nutritional screening and assessment methods.

To close this chapter, a description is given of the nutritional care protocol standardized by the discipline "Clinical Nutrition Practice" from the Pontifical Catholic University (PUC) of Campinas, São Paulo, Brazil, presented at the "Clinical Nutrition Week" congress held in Chicago, United States of America (USA), in 2008, and used by the surgical and clinical wards of the Celso Pierro Hospital and Maternity Hospital (PUC-Campinas University Hospital) (Leandro-Merhi et al. 2008). This protocol consists of many items for screening, assessing, and monitoring the nutritional, clinical, and dietary statuses of hospitalized patients, such as patient's age, gender, admission date, length of stay, cause of hospitalization, diagnosis, complications, type of surgery, patient's complaints and habits on admission, detailed habitual nutrient and energy intakes, estimated nutritional requirements and intakes, all anthropometric measurements, laboratory tests, prescribed diet, and food acceptance during the entire stay. Other collected data include type of nutritional therapy (oral, enteral, or parenteral) and all its particularities. To investigate the patient's nutritional status and risk, this protocol uses the Subjective Global Assessment (SGA) and the Nutritional Risk Screening-2002 (NRS-2002) and monitors the patient's weight and type of nutritional intervention used.

Summary Points

1. Length of stay is determined by variables inherent to the response to treatment, but it is a relative variable associated with factors that do not depend on the disease or treatment provided.
2. Response to treatment is directly associated with nutritional status.
3. Hospital-associated malnutrition has long been recognized as a problem, but it is still widely neglected by care routines.
4. The prevalence of hospital-associated malnutrition varies greatly, and the associated costs are always high, justifying intervention policies that focus on controlling the problem.
5. The variation observed in the prevalences of hospital-associated malnutrition is justified by the type of disease and method used for the nutritional diagnosis.
6. Whether a patient is in an intensive care or general care unit, long hospital stays are always associated with malnutrition, regardless of the tool used for his/her nutritional assessment.

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