Original Article

Evaluation of nutritional risk in adult inpatients in the Hospital Regional Norte of Sobral, Ceará, Brazil

Avaliação do risco nutricional em adultos internados no Hospital Regional Norte de Sobral, Ceará, Brasil

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RESUMO: O objetivo desta pesquisa foi avaliar o risco nutricional de adultos no Hospital Regional Norte em Sobral, Ceará. O estudo descritivo ocorreu de maio a junho de 2018 na emergência do Hospital Regional. A amostra foi constituída por 80 pacientes adultos de ambos os sexos, com idade entre 18 a 59 anos e admitidos nas últimas 48 horas. Aplicou-se dois instrumentos de triagem nutricional: Avalição Subjetiva Global e Nutritional Risk Screening - 2002 em cada paciente ao leito. Os dados foram analisados por estatística descritiva básica e a concordância entre os métodos através do coeficiente de Kappa. Quinze pacientes se apresentaram desnutridos pela Avalição Subjetiva Global, dos quais treze eram desnutridos moderados e dois, gravemente desnutridos. Os demais 65 participantes estavam bem-nutridos. O Nutritional Risk Screening 2002 mostrou que 23 pacientes tinham risco nutricional e 57 não. Houve concordância moderada entre os métodos de triagem (k = 0,67), mas o Nutritional Risk Screening 2002 mostrou uma maior efetividade em determinar o risco nutricional. Concluiu-se que a utilização de um método de identificação de risco nutricional confiável é muito importante para que uma terapia nutricional seja iniciada o mais breve possível. Logo, o uso de instrumentos de triagem, especialmente do Nutritional Risk Screening 2002, é o primeiro passo para a adequada atenção nutricional em adultos.

Palavras-chave: Estado nutricional; Avaliação nutricional; Desnutrição.

ABSTRACT: The objective of this research was to evaluate the nutritional risk of adults at the Hospital Regional Norte in Sobral, Ceará, Brazil. The descriptive study was conducted from May to June 2018, in the emergency unit of the Hospital Regional. The sample was composed of 80 adult patients of both genders, aged between 18 and 59 years old, and admitted in the prior 48 hours. Two nutritional screening instruments were applied with each patient, at their bed: Subjective Global Assessment and Nutritional Risk Screening - 2002. The data were analyzed using basic descriptive statistics. Agreement between the methods was measured by the Kappa coefficient. Fifteen patients were malnourished according to the Subjective Global Assessment, of which thirteen were moderately malnourished and two were severely malnourished. The remaining 65 participants were wellnourished. The Nutritional Risk Screening 2002 revealed that 23 patients were at nutritional risk and 57 were not. There was moderate agreement between the screening methods (k = 0.67), but the Nutritional Risk Screening 2002 was more effective in determining nutritional risk. Thus, it was concluded that the use of a reliable nutritional risk screening method is very important, so that nutritional therapy can be initiated as soon as possible. Therefore, the use of screening instruments, especially the Nutritional Risk Screening 2002, is the first step towards adequate nutritional care in adults.

Descriptors: Nutritional status; Nutritional assessment; Malnutrition.

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INTRODUCTION

Malnutrition is a deficiency or imbalance of energy, protein, and other macro and micronutrients that leads to physiological, metabolic, and immunological adverse effects, with clinical and functional consequences that can be acute or chronic¹. In hospitalized individuals, malnutrition is the result of a series of factors occurring before or during hospitalization, associated with a certain disease, treatment or even both. A few years ago, there was an increase in the number of malnourished patients in hospitals, increasing the length of stay and morbidity and mortality rates².

The prevalence of disease-related malnutrition varies from 37% to 64%, according to a multicenter study with 9,348 hospitalized patients in 13 Latin American countries. In Brazil, the Brazilian National Survey on Hospital Nutrition - IBRANUTRI, carried out in 1996 with 4,000 patients of 25 public hospitals in different regions of the country, revealed that 48.1% of hospitalized patients were malnourished. A study by the British Association for Enteral and Parenteral Nutrition (BAPEN), carried out between 2008 and 2010, found that the prevalence of malnutrition among patients admitted to hospitals in the United Kingdom was 34%^{3,4}.

The method for identifying patients at risk of malnutrition is called nutritional screening. It consists of a set of tools applied before nutritional assessment and based on easy, fast and non-invasive measures and procedures, with good replicability and low cost. It must be applied to all hospitalized patients within a period of up to 72 hours after admission^{5,6,7}.

The nutritional screening tools described in the literature vary in terms of the nature of the questions and have limitations, advantages and disadvantages when used with specific populations⁵. Some of the nutritional screening instruments that stand out in the literature are the *Subjective Global Assessment* - SGA, *Nutritional Risk Screening 2002* - NRS 2002, *Malnutrition Universal Screening Tool* - MUST, *Malnutrition Screening Tool* - MST, *Mini Nutritional Assessment* - MNA and Mini Nutritional Assessment Short Form - MNA-SF⁸.

The use of nutritional screening tools is recommended by several international institutions, as they are considered well-structured, studied, and validated instruments. Recognizing the importance of assessing nutritional risk, the Ministry of Health of Brazil, through Ordinance No. 343/2005, instituted mandatory nutritional screening protocols in hospitals. However, there are no standardized instrument for this screening; it is necessary to define the most appropriate instrument for Brazilian public hospitals^{6,9}. Therefore, the question that arises is: are the screening instruments used in hospitals efficient in detecting malnutrition, nutritional risk, or both in hospitalized patients?

Screening is used not only to detect possible malnutrition, but also to identify patients who are at increased risk of nutritional problems during hospitalization. Thus, early assessment of nutritional status is essential to prevent or even interrupt the process of malnutrition, which can negatively affect the treatment and increase morbidity and mortality, length of hospital stay, and patient costs¹⁰. Thus, this study aimed to assess the nutritional risk of adults admitted to a large hospital in the city of Sobral, Ceará, Brazil.

CASES AND METHODS

This is a cross-sectional descriptive study carried out from May to June 2018 in the Emergency Department of the Hospital Regional Norte, a high complexity and large institution, intended for the care of patients of the National Unified Health System, in the city of Sobral, state of Ceará, Brazil. The participants of the study were 80 adult patients of both genders, aged between 18 and 59 years old, who were admitted in the prior 48 hours and signed the Informed Consent Form (TCLE). Older adults were not included in the survey. The exclusion criteria were: patients admitted for obstetric or psychiatric reasons; those in a state of unconsciousness or disorientation; patients with an edema; and those whose nutritional screening was not conducted by the hospital. A sampling error of 5% and a confidence interval of 95% were considered.

Patients were invited to participate in the study after being informed about the objectives, methods, expected benefits and possible risks of the research and signing the TCLE. It is worth noting that nine of the interviewees were illiterate and their consent to participate in the study was obtained through the fingerprint of their right thumb.

Nutritional screening was applied to the patients after their authorization. The first method used was the SGA. The questionnaire was applied on admission, at the patient's hospital bed. The interview included questions about unintentional weight loss, changes in eating patterns, and presence of nausea, vomiting, diarrhea, or anorexia. After the interview, physical examination with palpation and inspection of the face, chest, abdomen, and upper and lower limbs was conducted to assess loss of subcutaneous fat, muscle mass, and presence of ascites and edema. Finally, to obtain the clinical diagnosis, the patients' medical records were consulted.

The nutritional risk of these patients was also assessed through the NRS 2002. The questionnaire was applied by the team of the Hospital's Nutrition and Dietetics service (Nutritionists and Nutrition interns), as the use of screening tools was part of this team's routine. Data collection was only conducted after the consent of the hospital and authorization from the Ethics and Research Committees.

Quantitative variables were analyzed using basic descriptive statistics (mean and standard deviation). The Kappa coefficient was used to verify agreement between the methods. For this calculation, the variables had to be adjusted, that is, patients classified by the SGA as moderately and severely malnourished (B + C) and by the NRS 2002 as 'with nutritional risk' (\geq 3) were categorized as malnourished. Patients considered well-nourished were those classified by the NRS 2002 as 'without nutritional risk' (< 3) and by the SGA as well-nourished $-A^{11}$. The Kappa Coefficient was analyzed based on the categories proposed by Landis and Koch (1977). Thus, the rate of agreement can be interpreted as follows: 0-0.1, no agreement; 0.11-0.40, low agreement; 0.41-0.60, medium agreement; 0.61-0.80, moderate agreement; and 0.81-1, excellent agreement¹².

The study was previously evaluated and approved by the Research Ethics Committees from the *Centro Universitário* INTA - UNINTA (Opinion No. 2,660,610, of May 17, 2018) and from the *Instituto de Saúde e Gestão Hospitalar* – ISGH (Opinion No. 2,660,610, of May 17, 2018). After approval, the study was carried out according to the ethical precepts of Resolution No. 466, of December 12, 2012, of the National Health Council¹³. Therefore, the four principles of bioethics were followed, that is, autonomy, non-maleficence, beneficence, and justice¹⁴.

RESULTS

Most of the patients investigated (n=80) were men (Table 1). Age ranged between 19 and 59 years, with a range of 40 years and mean of 41 ± 11.7 years. The main causes for hospitalization, which accounted for almost 40% of admissions, were abdominal and pelvic pain, appendicitis, erysipelas, foreign bodies, and snakebites (Table 2).

Table 1 - Distribution by gender of the participants (n=80) of the study in the Clinical Emergency Unit of the Hospital Regional Norte. Sobral, Ceará, Brazil, 2018

Gender	No	(%)
Male	48	60.0
Female	32	40.0
TOTAL	80	100%

Source: Elaborated by the authors.

Table 2 - Distribution of causes of hospitalization of participantsin the Clinical Emergency Unit of the Hospital Regional Norte.Sobral, Ceará, Brazil, 2018

Cause of Hospitalization	No	(%)
Abdominal and pelvic pain	20	25%
Appendicitis	4	5.0%
Erysipelas	3	3.75%
Strange body	2	2.5%
Snakebite	2	2.5%
Dyspnea	2	2.5%
Pneumonia	2	2.5%
Melena	2	2.5%
Others	43	53.75%
TOTAL	80	100%

Source: Elaborated by the authors.

The nutritional screening with the SGA showed that less than a fifth of the patients were malnourished, with emphasis on moderately malnourished patients (Graph 1). However, when the NRS 2002 was applied, almost a third of the patients were classified as having nutritional risk (Graph 1). There was a moderate agreement between the SGA and the NRS 2002 (Graph 2), as shown by the Kappa Coefficient (k = 0.67).

Graphic 1 - Nutritional status according to the SGA in the Hospital Regional do Norte. Sobral, Ceara, Brazil, 2018



Source: Elaborated by the authors.

Graph 2 – Agreement between the nutritional screening methods applied to the participants (n=80) in the Clinical Emergency Unit of the Hospital Regional do Norte. Sobral, Ceará, Brazil, 2018



Source: Elaborated by the authors.

DISCUSSION

There was a similarity between this study and others regarding the higher prevalence of male patients when the SGA and NRS 2002 were applied. Barbosa et al.¹⁵ applied these nutritional screening tools in 763 patients at a university hospital, of which most were men (50.5%), with a mean age of 53.5 ± 18.1 years, and 59.7% of the patients were not older adults. Lima and Silva¹⁶ carried out a similar study with 70 patients in a hospital, of which 70% were men, with a mean age of 37.64 ± 12.79 years, and none were older adults.

Raslan et al.¹⁷ conducted a study in a public hospital in São Paulo with adult and older adult patients and compared three nutritional screening tools: NRS 2002, MUST and MNA-SF. Nutritional risk was present in 73.2% of participants when evaluated with the NRS 2002; 39.6% with the MNA-SF; and 27.9% with the MUST. According to these authors, the NRS 2002 presented high sensitivity and specificity in the identification of patients at nutritional risk. In the present study, the NRS 2002 was more efficient in detecting the nutritional risk of hospitalized patients.

Costa et al.¹⁸ conducted a study with 30 individuals with HIV/AIDS and observed that, among the nutritional screening tools used, the MUST was the one that detected the higher percentage of individuals at nutritional risk, with a result of 63.3% (n=19). According to the NRS 2002, 56.7% (n=17) of the patients were at nutritional risk, while the SGA classified only 13.3% (n=4) of the sample as malnourished. Although no patient with this disease was found in the medical records in this research, the study by Costa et al. demonstrates that the NRS 2002 was more efficient than the SGA as a nutritional screening tool, a fact

that was also observed in our investigation.

Similar to what was found in this study, a multicenter study carried out by Velasco et al.¹⁹ in Spain identified a moderate agreement between the SGA and the NRS 2002 (k = 0.62). These researchers also found a lower prevalence of malnutrition in patients who were candidates for elective surgery when compared to clinical patients, and demonstrated that the sensitivity and specificity of the NRS 2002 were lower in these groups. Even so, the NRS 2002 was the recommended tool to screen for nutritional status at patient admission. Contrastingly, Leonhardt and Paludo²⁰ did not find a good level of agreement between the SGA and the NRS 2002 in a retrospective study carried out with hospitalized patients (n=47) in a Health Institution in the state of Rio Grande do Sul. According to these authors, the SGA is a more specific tool that can detect and classify the degree of malnutrition and can be corrected by collecting other information. However, the use of secondary data is a limitation when comparing the results with those of primary studies like the present one.

Calazans et al.¹¹ evaluated surgical patients in a hospital in the state of Espírito Santo and found a weak agreement between the SGA and the NRS 2002 (k = 0.23), even though the correlation was high in the category of "well-nourished" patients (80.7%) and above 50.0% in the category "with nutritional risk". According to the authors, the research results may have been influenced by the sample size (n=60), the isolated assessment, and the characteristics of the diseases. This was noticeable, as the present study evaluated patients from a medical clinic, and not from a surgical clinic. However, do Nascimento et al.²¹ conducted a retrospective study with 963 adult patients admitted to a public hospital in Curitiba, analyzing their medical records, which included nutritional screening with the NRS 2002 and the SGA. The researchers did not find agreement between the methods in the detection of malnutrition. Therefore, some studies produced findings contradicting those of the present study.

Kyle et al.²² tested the sensitivity and specificity of three nutritional screening instruments (NRS 2002, Nutritional Risk Index - NRI and MUST) compared to the SGA. Among the instruments evaluated, the NRS 2002 had higher sensitivity and specificity than the MUST and NRI, compared to SGA. The authors considered the NRS 2002 to be the method that is more related to the length of hospital stay, as it is a practical instrument that requires less training time when compared to the SGA, which is in agreement with our study.

The NRS 2002 was also a more effective method for surgical patients when compared to the anthropometric method (triceps skinfold – TSK, arm circumference – AC, arm muscle circumference – AMC and body mass index – BMI) and biochemical method (albumin), as it revealed a high percentage (75%) of patients at nutritional risk²³. According to Raslan et al.¹⁷, the NRS 2002 does not discriminate between patients, covers all morbid conditions, and can be applied to all adults, regardless of disease and age. As it does not exclude any specific group, this technique is the most recommended. This was also observed in our study.

Yamauti et al.²⁴ also evaluated the relationship between anthropometric nutritional assessment and a nutritional screening instrument, comparing the SGA with AC and TSK in patients with heart disease. Nutritional screening had more sensitivity and specificity in identifying malnourished patients. According to the authors, in the sample of 106 participants, malnutrition prevalence was 51.9% by the SGA and only 42.5% by anthropometric assessment. A similar analysis was proposed by Sampaio, Pinto and Vasconcelos²⁵, who analyzed a sample of 50 adults of both genders admitted to the General Hospital of Fortaleza, Ceará. However, in this study, anthropometric assessment (weight, height, AC and TSK) was more efficient in identifying patients at nutritional risk. According to these authors from Ceará, only 14% of patients were classified as malnourished by the SGA, while 44% were malnourished according to anthropometric assessment. Although the present study did not compare nutritional screening with anthropometric tools, the literature shows that the NRS 2002 is more efficient than the SGA in detecting nutritional risk when compared to anthropometry.

The differences between the ASG and the NRS 2002 may be associated with the characteristics of the instruments. The SGA considers a longer period of evaluation, such as weight loss in 6 months, gastrointestinal changes present for more than 15 days, and functional capacity. The NRS 2002 is limited to shorter investigation

periods, and does not consider some of the information included in the SGA, since it is a faster and simpler nutritional screening tool²⁶.

Another relevant factor that may explain the results found in this study is the fact that the SGA does not detect acute malnutrition, as it is believed that this instrument is incapable of recognizing subtle changes in nutritional status. In addition, the characteristics and clinical conditions of the population could contribute to this result, as patients are admitted to the emergency room with acute clinical situations, which do not immediately influence their nutritional status²⁷.

Minimizing the difficulties related to nutritional screening of hospitalized patients is a challenge. The different factors that may interfere with nutritional status, such as the contextual specificities of the disease, the inflammatory response, the physiological changes resulting from the disease, the type and severity of the malnutrition itself, among others, should be carefully evaluated, especially in studies with a cross-sectional design, conducted in a single hospital, in a short period, and with a limited sample. One of the ways to control these biases when choosing the best nutritional screening method would be to standardize the protocols for the nutritional assessment of hospitalized patients, as suggested by Behrmann and Lima²⁸.

Another important factor that should be considered in this study is that the patient and/or their companion may provide incorrect data in the nutritional anamnesis. During the application of the questionnaire, they were repeatedly unable to provide facts about their clinical history, such as the onset of symptoms, usual weight and unwanted weight loss, changes in food intake, and gastrointestinal symptoms and their duration. The lack of information can significantly hinder the assessment and classification of nutritional risk. Thus, further studies should be conducted, mainly in hospital emergency settings, to allow the prevention of complications associated with malnutrition and the early implementation of nutritional therapy, when necessary.

CONCLUSION

In conclusion, one third of the evaluated patients were malnourished, especially men. This result is consistent with national and global realities, as it reveals the presence of hospital malnutrition regardless of the evaluation method applied. It is worth mentioning that the use of a reliable nutritional risk screening method is very important, so that nutritional therapy can be initiated as soon as possible. In this study, the NRS 2002 was efficient in determining nutritional risk. Thus, the use of this method can be a reliable option for the identification of nutritional risk among adult patients admitted to this hospital. **Contribution of the authors**: *Mauricyanne Sales Teixeira*: conception; data collection; data analysis and interpretation; elaboration of the article; critical review of important intellectual content; and final approval of the version to be published; *Jorge Luís Pereira Cavalcante*: data analysis and interpretation; elaboration of the article; critical review of important intellectual content; final approval of the version to be published; and submission of the manuscript to the journal.

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