



Original article

Translation and adaptation of the *NUTRIC Score* to identify critically ill patients who benefit the most from nutrition therapy



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SUMMARY

Introduction and objectives: Due to the scarcity of tools to assess the nutritional risk in critically ill patients, the NUTRITION Risk in the Critically ill Score (NUTRIC Score) was developed and validated primarily in a limited population to quantify the risk of adverse events that may be modified by aggressive nutrition therapy. The objective of this study was to translate and adapt the NUTRIC Score into Portuguese language for further demonstrate its feasibility and clinical utility in Brazilian Intensive Care Units (ICUs).

Methods: This translation and adaptation process is part of a study for the validation of NUTRIC Score in Brazil. Translation was performed according to standardized steps: initial translation, synthesis of translations, back-translation, revision and application of the instrument by specialists and evaluation of cultural adaptation. We conducted a pilot study within 50 patients mechanically ventilated for more than 48 h in four ICUs in Southern Brazil to determine the prevalence of patients who were the most likely to benefit from aggressive nutrition therapy.

Results: The translation and adaptation process produced a valid version of NUTRIC Score in the Portuguese language. The translated version was easily introduced into four Brazilian ICUs and the prevalence of patients with high score and likely to benefit from aggressive nutritional intervention (mean age 61.4 ± 15.3 years) was 46% (23 individuals, 95%CI 0.33–0.60).

Conclusions: The NUTRIC Score has been successfully translated into Portuguese and the prevalence of nutritionally-high risk patients may be around 50% in Brazilian ICUs.

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1. Introduction

Early identification of hospital malnutrition using specific indicators and tools is crucial in different scenarios [1–4], and

appropriate instruments to define effective nutritional intervention measures are necessary.

Due to the scarcity of tools to evaluate the nutritional risk in critically ill patients, the NUTRITION Risk in the Critically ill Score (NUTRIC Score) was developed and validated in a limited Caucasian population, aiming to quantify the risk of adverse events that may be modified by aggressive nutrition therapy [5]. The scoring system includes six variables: age, Acute Physiology and Chronic Health Evaluation (APACHE II), days from hospital to ICU admission,

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number of comorbidities, Sequential Organ Failure Assessment (SOFA), and interleukin 6 (IL-6) [6,7]. A subsequent analysis demonstrated the validity of the NUTRIC Score without the IL-6 levels in another distinct patient population [7]. The higher the sum of scores from these various components, the greater the likelihood that patients are at nutritional risk and will benefit from a nutritional therapy intervention [5–7].

The NUTRIC Score is the first nutritional risk assessment tool specifically developed for critically ill patients; it is a feasible and clinically useful instrument, since it evaluates variables that are routinely assessed in Intensive Care Units (ICUs). Translation of NUTRIC Score from English to Portuguese language would allow its use in Portuguese speaking countries and the comparisons of critically ill patients between different populations. The objective of this study was to translate and adapt the NUTRIC Score into Portuguese language to further demonstrate its feasibility and clinical utility in Brazilian ICUs. We also aimed to detect the prevalence of individuals at higher scores and who were the most likely to benefit from aggressive nutrition therapy.

2. Materials and methods

This translation and adaptation process is part of a study for the validation of NUTRIC Score to be developed in Brazil. Since the NUTRIC Score includes variables that are not self-reported, translation process was adapted from the method proposed by Beaton et al. [8] and performed according to the following steps: initial translation, synthesis of translations, back-translation, revision and application of the instrument by specialists and evaluation of cultural adaptation.

In the first stage, a forward translation from English [5] to Portuguese language was done. Two bilingual and certified translators, who had Portuguese as mother tongue (Translator1 and Translator2) performed two independent translations, which were defined as T1 and T2 versions. As suggested, the translators had different backgrounds: Translator1 (M.M.K.) is a nutritionist who is familiar with the terminology of the area covered by the instrument, and was aware about the study's objective; Translator2 (T.L.P.), who is not familiar with the area terminology, is a certified translator without knowledge in the nutrition field, and was not aware about the rationale of the study.

In the synthesis of translations phase, the two translators and one of the investigators of the study (A.M.), who also translated the instrument into Portuguese language, discussed all versions and agreed on a common Portuguese version, defined as T12. The investigator made note of discrepancies about the translations and divergent points.

In the phase of back translation, an English native speaking certified translator fluent in Portuguese language translated T12 into English. This professional did not have knowledge in the nutrition field, nor was informed about the objectives of the study.

In the revision stage, a Committee was organized to discuss all translated versions against the original tool, and a “prefinal version” of the NUTRIC Score was designed. The composition of the Committee included the following figures: one of the translators (A.M.), one physician (an intensivist, J.A.H.) and three nutritionists (M.R., E.I.R. and D.F.). They participated in a focus group, aiming to consolidate all the versions of the instrument, including instructions for revisions and application of the instrument in a pilot study. Each question was evaluated according to the viewpoints from all professionals, mainly about the idiomatic, semantic, contextual and cultural equivalences.

In the last stage, all reports and forms of the translation and adaptation processes were submitted to the author of the original instrument (D.K.H.) for approval.

A pilot study was conducted in 50 critically ill patients consecutively enrolled within 48 h from their admission to four ICUs of the Santa Casa de Porto Alegre hospital complex, to assess understanding and applicability of the “prefinal version” of the translated NUTRIC Score among five healthcare professionals (nutritionists and physicians). Individuals who were expected to remain less than 24 h in the ICU, those with overdoses and whose medical records were incomplete (without APACHE II and SOFA score values) were excluded.

Demographic data (age, gender), hospital length of stay (in days), number of comorbidities (registered in accordance to the International Classification of Diseases [ICD-10] and stratified as cardiovascular/vascular, cancer, endocrine, respiratory, gastrointestinal, neurologic, AIDS/infectious and renal comorbidities), and body mass index (BMI, in kg/m²) were obtained from medical records previously to ICU admission. Mechanical ventilation was registered at ICU, and the first data available regarding APACHE II [9], SOFA score [10] (which were calculated by physicians and registered at patients' charts), C-reactive protein (CRP) and arterial blood gasometry were collected from medical records. Arm circumference, in cm, was measured by nutritionists in ICU at midway between the acromion and the inferior border of the olecranon with an inelastic tape, and registered in a standardized questionnaire.

Both dietitians and physicians calculated the NUTRIC Score, after data collection from medical records. Because of the absence of data regarding IL-6 levels in the medical records, since this interleukin is not evaluated among patients admitted in the Santa Casa de Porto Alegre hospital complex, the final NUTRIC score was calculated without this variable as previously suggested [5] and validated [7]; individuals were classified at high score (5–9) or low score (0–4).

The prevalence of the patients who are the most likely to benefit from aggressive nutrition therapy and the 95% confidence interval was calculated using the SPSS statistical package, version 17.0 (SPSS Inc., Chicago, IL, USA). Data were described as mean [\pm standard deviation (SD)], median [interquartile range (IR)] or n (%); Kolmogorov–Smirnov was performed to test the normality of the variables. Student's *t* test was used to compare parametric variables (age, BMI, arm circumference, pH, bicarbonate [HCO₃], oxygen saturation [SO₂], partial pressure of carbon dioxide [pCO₂], partial pressure of oxygen [PO₂]); Mann–Whitney test was used to compare nonparametric variables (days from hospital admission to ICU, APACHE II, SOFA score, number of comorbidities, lactate, CRP); and Chi-squared test was used to compare proportions (gender and use of mechanical ventilation) according to NUTRIC Score groups (low score and high score). Pearson's correlation test was used to detect a possible correlation between the number of comorbidities and NUTRIC Score, and the Cronbach's alpha was calculated in order to verify internal consistency of the instrument. The study was approved by the Research Ethics Committee of this hospital (protocol number 40073414.9.0000.5335), and by the Research Ethics Committee of the Federal University of Health Sciences of Porto Alegre.

3. Results

All the 50 individuals evaluated had their data easily obtained from medical records, and neither the nutritionists nor the physicians reported difficulties in register them. Table 1 shows the main clinical characteristics of the sample; individuals were predominantly male, with overweight according to BMI, had more than 2 comorbidities and a long hospitalization before ICU admission. As expected, patients with high NUTRIC Score were older, had higher

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