



ASSOCIATION BETWEEN DIFFERENT METHODS OF NUTRITION ASSESSMENT IN PATIENTS WITH HIV/AIDS IN A PUBLIC HOSPITAL

Associação entre diferentes métodos de avaliação nutricional em pacientes com HIV/AIDS em um hospital público

Asociación entre distintos métodos de evaluación nutricional de pacientes con VIH/SIDA de un hospital público

Cristiano Silva da Costa

Ceará School of Public Health - (Escola de Saúde Pública do Ceará - ESP/CE) - Fortaleza (CE) - Brazil

Celso Lourenço de Arruda Neto

State University of Rio Grande do Norte - (Universidade Estadual do Rio Grande do Norte - UERN) - Mossoró (RN) - Brazil

Wilma Félix Câmpelo

Federal University of do Ceará - (Universidade Federal do Ceará - UFC) - Fortaleza (CE) - Brazil

Ana Luiza de Rezende Ferreira Mendes

University Center Estácio of Ceará - (Centro Universitário Estácio do Ceará) - Fortaleza (CE) - Brazil

ABSTRACT

Objective: To assess the nutritional status of individuals diagnosed with HIV/AIDS hospitalized in a public infectious diseases reference hospital, verifying the association between the different screening methods and the anthropometric evaluation. **Methods:** Descriptive, quantitative and cross-sectional study that evaluated 30 patients with HIV/AIDS in 2016, admitted within 72 hours in a public infectious diseases reference hospital of Fortaleza, Ceará, with data collection consisting in the application of subjective nutritional screening tools (MUST: Malnutrition Universal Screening Tool; SGA: Subjective Global Assessment of Nutritional Status; and NRS-2002: Nutritional Risk Score-2002) and anthropometric measurements carried out for calculation of the Body Mass Index (BMI) and the Arm Circumference (AC), with subsequent classification according to the parameters described in the literature. The association between subjective and objective methods was evaluated using Fisher's exact test, with $p \leq 0.05$. **Results:** Individuals of both genders, aged between 23 and 55 years, participated in the research. The BMI ranked 40.1% of them with thinness, while the AC diagnosed 89.3% (n=25) of the sample with malnutrition. Among the methods, MUST and NRS-2002 identified a higher percentage of patients at risk or with high nutritional risk. There was association only between the variables BMI and SGA ($p=0.018$), BMI and NRS-2002 ($p=0.002$), and BMI and MUST ($p=0.018$). **Conclusion:** The study found association between the three subjective methods and the assessment using the BMI. However, NRS-2002 and MUST proved more capable of identifying nutritional risk in comparison to SGA.

Descriptors: Acquired Immunodeficiency Syndrome; Anthropometry; Malnutrition; Hospitalization; Triage.

RESUMO

Objetivo: Avaliar o estado nutricional de indivíduos diagnosticados com HIV/AIDS internados em um hospital público de referência em doenças infecciosas, verificando se há associação entre os diferentes métodos de triagem e a avaliação antropométrica. **Métodos:** Estudo transversal, descritivo e quantitativo avaliou 30 pacientes com HIV/AIDS em 2016, admitidos em até 72 horas em um hospital de referência em doenças infecciosas de Fortaleza, Ceará, cuja coleta consistiu na aplicação de ferramentas subjetivas de triagem nutricional (MUST: Instrumento Universal de Triagem de Desnutrição; ANSG: Avaliação Nutricional Subjetiva Global; NRS-2002: Escore de Risco Nutricional-2002) e realização de medidas antropométricas para cálculo do Índice de Massa Corpórea (IMC) e da Circunferência do Braço (CB), com posterior classificação conforme parâmetros da literatura. Avaliou-se por meio do teste Exato de Fisher a associação entre os métodos subjetivos e objetivos, com $p \leq 0,05$. **Resultados:** Participaram indivíduos de ambos os sexos, com idade entre 23 e 55 anos. O IMC classificou 40,1% (n =12) com magreza, enquanto a CB diagnosticou 89,3%(n =25) com desnutrição. Entre os métodos, MUST e NRS-2002 identificaram maior percentual de pacientes com risco ou alto risco nutricional. Houve associação apenas entre as variáveis IMC e ANSG ($p=0,018$), IMC e NRS-2002 ($p=0,002$) e IMC e MUST ($p=0,018$). **Conclusão:** Encontrou-se associação entre os três métodos subjetivos e a avaliação por meio do IMC. Contudo, a NRS-2002 e a MUST mostraram maior capacidade de determinar risco nutricional em relação à ANSG.

Descritores: Síndrome da Imunodeficiência Adquirida; Antropometria; Desnutrição; Hospitalização; Triagem.



RESUMEN

Objetivo: Evaluar el estado nutricional de individuos con VIH/SIDA ingresados en un hospital público de referencia en enfermedades infecciosas y la asociación entre los distintos métodos de selección y evaluación antropométrica. **Métodos:** Estudio transversal, descriptivo y cuantitativo que evaluó 30 pacientes con VIH/SIDA en 2016 que ingresaron hasta 72 horas en un hospital de referencia en enfermedades infecciosas de Fortaleza, Ceará con la aplicación de herramientas subjetivas de selección nutricional (MUST: Instrumento Universal de Selección de Desnutrición; ANSG: Evaluación Nutricional Subjetiva Global; NRS-2002: Cribado de Riesgo Nutricional-2002) y la realización de medidas antropométricas para el cálculo del Índice de Masa Corporal (IMC) y de la Circunferencia del Brazo (CB) con la clasificación a posteriori según los parámetros de la literatura. El análisis se dio a través del Test exacto de Fisher y la asociación entre los métodos subjetivos y objetivos con $p \leq 0,05$. **Resultados:** Participaron individuos de ambos los sexos con edad entre los 23 y 55 años. El 40,1% ($n = 12$) tuvo el IMC clasificado como delgadez mientras la CB diagnosticó el 89,3% ($n = 25$) de los individuos con desnutrición. Entre los métodos, el MUST y el NRS-2002 identificaron mayor porcentaje de pacientes con riesgo o riesgo nutricional elevado. Hubo asociación solamente entre las variables IMC y ANSG ($p = 0,018$), el IMC y la NRS-2002 ($p = 0,002$) y el IMC y el MUST ($p = 0,018$). **Conclusión:** Se encontró asociación entre los tres métodos subjetivos y la evaluación a través del IMC. Sin embargo, la NRS-2002 y el MUST mostraron más capacidad para determinar el riesgo nutricional respecto la ANSG.

Descriptor: Síndrome de Inmunodeficiencia Adquirida; Antropometría; Desnutrición; Hospitalización; Triage.

INTRODUCTION

First appearing in Brazil in the early 1980s, AIDS still represents a problem at the national and international levels, demanding of the health facilities strategies for its control and prevention. Initially associated with specific groups (homosexuals and injecting drug users), over the years the infection has reached different groups and age ranges (heterosexuals, children and the elderly)⁽¹⁾.

The cases of HIV contamination reported in Brazil since the beginning of the epidemic until June 2016 reached 842,710. Of this total, 15.1% occurred in the Northeast Region. In Ceará, 19,579 cases were reported during this period, with the emergence of 537 new cases in the first half-year of 2016⁽²⁾.

In view of this scenario, the different levels of care (primary, secondary and tertiary) should design Health Promotion strategies for groups living with HIV/AIDS. Health Promotion aims at guaranteeing the improvement of the population's quality of life, through actions aimed at the comprehensive care of the individual and the prevention of diseases. For that, the engagement of health professionals and public policy managers is needed⁽³⁻⁵⁾.

Among the relevant features of AIDS is its ability to alter the nutritional status of the individuals, often markedly, causing nutrient deficits, which in turn lead to a longer recovery period in hospitalized patients. Factors such as opportunistic infections and the drug therapy itself can bring about nutritional and bodily changes, contributing to changes ranging from weight loss and body mass depletion to the advent of overweight or elevated serum lipid levels^(6,7).

Given this situation, the assessment of nutritional status aims to identify nutrition disorders in order to allow a more adequate intervention, thus helping to recover or maintain the individual's health. The methods used to evaluate the nutritional status can be objective (anthropometry, body composition, biochemical tests and food consumption) or subjective (physical examination and nutrition screening)⁽⁸⁾.

The most widely used anthropometric measures are weight, height, circumferences (arm, waist, abdominal) and skinfolds (triceps, subscapular and suprailiac)⁽⁹⁾. The current weight, along with height, is used to calculate the BMI, which is a simple method of defining nutritional status⁽⁸⁾.

Nutrition screening aims at identifying individuals at nutritional risk, in order to analyze the need for a complementary or more detailed evaluation. The screening methods consist in systematizing questions which investigate the existence of characteristics that may be related to, or reflect, nutritional deterioration^(10,11).

Among the best known instruments are the Subjective Global Assessment (SGA), Nutritional Risk Index (NRI), Nutrition Risk Screening-2002, Mini Nutritional Assessment (MNA), Mini Nutritional Assessment Short Form (MNA-SF), Malnutrition Screening Tool (MST) and Malnutrition Universal Screening Tool (MUST). Analyzing and knowing the features of the protocols is important in order to define which is the most appropriate method for a particular group⁽¹²⁾.

Motivated by the importance of early determining the presence of nutritional risk by means of screening protocols, and also considering that the protocols should be integrated to a subsequent anthropometric evaluation, so that proper nutrition interventions be performed during the hospital stay, this study aimed at evaluating the nutritional status of individuals diagnosed with HIV/AIDS hospitalized in a public hospital of reference in infectious diseases, verifying whether there is an association between the different screening methods and the anthropometric evaluation.

METHODS

A cross-sectional, descriptive and quantitative study was carried out in a public reference hospital for infectious diseases in the city of Fortaleza, Ceará, Brazil, from March to June 2016.

According to information from the Medical Records and Statistics Service (*Serviço de Arquivo Médico e Estatística - SAME*) of the hospital where the research was conducted, the mean monthly admission is 75 HIV/AIDS patients. The sample was calculated with a confidence level of 95% ($\alpha=0.05$), resulting in a total of 64 individuals. The actual number, however, corresponded to 30 participants of both genders, diagnosed with HIV/AIDS and hospitalized, with or without coinfection or co-morbidity. Criteria for inclusion in the study were adulthood (between 20 and 59 years of age) and admission within the past 72 hours, at maximum. As exclusion criteria, the study considered the inability of the patient to respond to the questionnaires and the impossibility of performing any of the anthropometric measurements.

Data collection was performed in four hospitalization units, through search in the medical records, nutrition screening protocols and collection of anthropometric measures. An adapted questionnaire⁽¹³⁾ addressing identification, socioeconomic and disease-related data (presence of coinfection or associated co-morbidity) was applied, followed by three nutrition screening protocols: SGA, NRS-2002 and MUST. The selection of such tools is justified by the fact that the SGA is already used in the institution, whereas NRS-2002 and MUST are instruments recommended by the European Society for Clinical Nutrition and Metabolism (ESPEN)⁽¹²⁾.

The anthropometric evaluation was performed in patients who roam, and in those bedridden as well. For the patients in condition to roam, the weight was measured in kilograms, using a digital scale of the brand Techline®, tempered glass, with a 150-kilogram capacity and a 50-gram division, duly adjusted and calibrated. Height was measured using a Welmy® mechanical scale with stadiometer⁽¹⁴⁾.

For patients whose height was not possible to be measured, an estimate was made from knee height measurement (KH). The weight was estimated according to specific formulas for each sex and race, based on KH and on the arm circumference (AC)⁽⁸⁾, which also aided in the diagnosis of nutritional status.

The results of the nutrition screening protocols were arranged according to the scoring criteria of each instrument. According to the results of the Subjective Global Assessment, the individual is classified as well nourished (0 to 16 points), moderately malnourished (17 to 22 points), or severely malnourished (> 22 points). For the NRS-2002, the following cutoff points were used: if ≥ 3 points, patient at nutritional risk (establish action plan, weight and weekly intake monitoring); if <3 points, carry out a new risk assessment in seven days. The classification of the MUST result was made according to the this scoring: 0 point - low risk (routine care); 1 point - medium risk (monitor); ≥ 2 points - high risk (treat)⁽¹⁵⁾.

After estimating the weight and height data, the BMI was calculated by dividing the weight (kg) by height (m) squared. For its classification, the World Health Organization (WHO) parameters⁽¹⁶⁾ were used: thinness grade 3 (BMI <16.0); thinness grade 2 (BMI ≥ 16.0 and <17.0); thinness grade 1 (BMI ≥ 17.0 and <18.5); adequate or eutrophic (BMI ≥ 18.5 and <25.0); overweight (BMI ≥ 25.0 and <30.0); obesity grade 1 (BMI ≥ 30.0 and <35.0); obesity grade 2 (BMI ≥ 35.0 and <40.0) and obesity grade 3 (BMI ≥ 40.0).

The AC was classified according to its percentage of adequacy in relation to the value in the percentiles: 50: <70%: Severe malnutrition; 70 - 80%: Moderate malnutrition; 80 - 90%: Mild malnutrition; 90 - 110%: Eutrophy; 110 - 120%: Overweight; 120%: Obesity⁽¹⁷⁾.

The data of the study were stored in a database, for further statistical analysis, using SPSS software version 20.0, where they were evaluated in terms of absolute frequency, percentage, means and standard deviation (SD). In order to test the association between subjective and objective (BMI and AC) methods, the Fisher's Exact test was applied, with a significance level of 5% ($p \leq 0.05$). For this test, all patients diagnosed with leanness by BMI were grouped in the thinness category. The eutrophic and overweight were also grouped into one only category, as a way to better distinguish patients with thinness and not thinness. Individuals with malnutrition diagnosed by means of the AC were categorized as malnutrition. As for the MUST, participants with low and medium risk were placed into the same category.

The study was conducted after approval by the Research Ethics Committee of the Ceará School of Public Health, under Opinion no. 1 403 573, in compliance with the requirements of Resolution no. 466/12 of the National Health Council⁽¹⁸⁾.

RESULTS

Of the 30 patients interviewed, 25 (83.3%) were male and 5 (16.7%) were female. The participants' ages ranged from 23 to 55 years, with a mean of 38.0 years (SD \pm 8.68). With regard to the marital status, 21 (70%) said they were single, and 6 (20.0%) were married. In relation to schooling, a greater number of responses (n=12) pointed to incomplete elementary school. The most cited monthly family income comprised the interval between one minimum wage (corresponding to R\$ 880.00) and a minimum and a half wage (46.7%, n=14). The majority of patients (n=23; 76.7%) reported not practicing any type of physical activity.

Regarding AIDS-related coinfections at admission, neurotoxoplasmosis was the most cited, with 6 patients diagnosed (20.1%), followed by diarrhea/diarrheal syndrome, with 3 patients (9.9%), and also pulmonary tuberculosis, diarrhea, histoplasmosis and acute renal failure, each of them described twice (6.7% of patients). It should be noted that some patients presented more than one coinfection or co-morbidity.

Among the nutrition screening protocols used, MUST was the one that detected a higher percentage of individuals with high nutritional risk, 63.3% (n=19). The NRS-2002 identified 56.7% (n=17) of patients at nutritional risk. Meanwhile, the SGA classified only 13.3% (n=4) of the sample as malnourished (Table I).

Table I - Classification of different nutrition screening protocols. Fortaleza, Cear a, Brazil, 2016.

	SGA	
	n	%
Well nourished	26	86.7
Moderately malnourished	4	13.3
TOTAL	30	100.0
	NRS-2002	
	n	%
Nutritional risk	17	56.7
Re-evaluate in 7 days	13	43.3
TOTAL	30	100.0
	MUST	
	n	%
Low risk	5	16.7
Medium risk	6	20.0
High risk	19	63.3
TOTAL	30	100.0

Source: Hospital of the Public Network of Fortaleza, Cear a. 2016. MUST: Malnutrition Universal Screening Tool. SGA: Subjective Global Assessment; NRS-2002: Nutrition Risk Screening-2002.

The nutritional status of the participants was determined through anthropometry, using BMI and AC. The categorization of nutritional status from the BMI resulted in the percentage of 40.1% (n=12) of the patients diagnosed with thinness. Compared to the adequacy of AC, it diagnosed more patients in malnutrition, 25 (89.3%) in total (Table II). Two patients were unable to have this measurement carried out.

Table II - Classification of the nutritional status through the Body Mass Index (BMI) and Arm Circumference Adequacy (AC). Fortaleza, Cear a, Brazil, 2016.

	BMI	
Classification	n	%
Thinness grade III	5	16.7
Thinness grade II	2	6.7
Thinness grade I	5	16.7
Eutrophy	13	43.3
Overweight	5	16.7
TOTAL	30	100.1
	AC	
	n	%
Severe malnutrition	9	32.1
Moderate malnutrition	5	17.9
Mild malnutrition	11	39.3
Eutrophy	3	10.7
TOTAL	28	100.0

Source: Hospital of the Public Network of Fortaleza, CE. 2016.

When the BMI was associated with the screening methods, it was verified that only 4 of the 12 patients diagnosed with thinness had been considered malnourished according to the SGA. Meanwhile, NRS-2002 and MUST had classified 11 patients as requiring nutritional intervention (Table III).

Table III - Association between the results of the nutrition screening protocols and the Body Mass Index (BMI). Fortaleza, Ceará, Brazil, 2016.

	BMI		p value
	Thinness n (%)	Eutrophy / Excess weight n (%)	
SGA			
Well nourished	8 (66.7)	18 (100.0)	0.01*
Moderately malnourished	4 (33.3)	-	
TOTAL	12 (100.0)	18 (100.0)	
NRS-2002			
Nutritional risk	11 (91.7)	6 (33.3)	0.00*
Re-evaluate in 7 days	1 (8.3)	12 (66.7)	
TOTAL	12 (100.0)	18 (100.0)	
MUST			
Low / Medium risk	1 (8.3)	10 (55.6)	0.01*
High risk	11 (91.7)	8 (44.4)	
TOTAL	12 (100.0)	18 (100.0)	

Source: Hospital of the Public Network of Fortaleza, CE. 2016. * $p \leq 0.05$. MUST: Malnutrition Universal Screening Tool. SGA: Subjective Global Assessment; NRS-2002: Nutrition Risk Screening-2002.

By associating the AC adequacy with the subjective methods, it was observed that, of the 25 participants considered malnourished by the anthropometric method, 16 were classified at nutritional risk by the NRS-2002 and MUST protocols, while the SGA pointed only 4 individuals with malnutrition (Table IV).

Table IV - Association between the results of nutrition screening protocols and the adequacy of Arm Circumference (AC). Fortaleza, Ceará, Brazil, 2016.

	Adequacy of AC		p value
	Malnutrition n (%)	Eutrophy n (%)	
SGA			
Well nourished	21 (84.0)	3 (100.0)	1.00*
Moderately malnourished	4 (16.0)	-	
TOTAL	25 (100.0)	3 (100.0)	
NRS-2002			
Nutritional risk	16 (64.0)	-	0.06*
Re-evaluate in 7 days	9 (36.0)	3 (100.0)	
TOTAL	25 (100.0)	3 (100.0)	
MUST			
Low/Medium risk	9 (36.0)	1 (33.3)	1.00*
High risk	16 (64.0)	2 (66.7)	
TOTAL	25 (100.0)	3 (100.0)	

Source: Hospital of the Public Network of Fortaleza, CE. 2016. Note: in this table, 28 participants were considered, given the impossibility of measuring the AC in two patients. * $p \leq 0.05$. MUST: Malnutrition Universal Screening Tool; SGA: Subjective Global Assessment; NRS-2002: Nutrition Risk Screening-2002.

According to the statistical test, association was present only between the BMI and SGA variables ($p=0.01$), the BMI and NRS-2002 ($p=0.00$) and the BMI and MUST ($p=0.01$).

DISCUSSION

In the present study, a majority of the patients were male, which corroborates previous works^(19, 20, 21). Regarding the marital status, a survey of 19 HIV/AIDS patients treated at an outpatient Infectious Diseases clinic in the city of Campo Mourão, Paraná⁽²²⁾, observed that most of the interviewees were single, as in the present study. In the same survey, 36.33%

did not complete the elementary school, which is close to the result in the current work (40.0%). A study carried out in the city of Itaperuna, Rio de Janeiro⁽²¹⁾, with 37 users of an outpatient program for HIV/AIDS treatment, found that a majority of respondents had a monthly income lower than a minimum wage, whereas, in the current work, a higher percentage was found in the interval between one minimum wage and one and a half minimum wage.

Neurotoxoplasmosis (NTX) was the coinfection most often cited in the current research. This is defined as a cerebral impairment resulting from toxoplasmosis, which, in turn, is a disease caused by the parasite *Toxoplasma gondii*. Despite being rare in immunocompetent individuals, this is the opportunistic infection that affects people with HIV more frequently, especially those with a total CD4+ cell count below 200 cells/mm³^(23,24). A study carried out with 250 patients at a Specialized Care Service in Pelotas, Rio Grande do Sul, showed that 80% of the individuals presented seropositivity for NTX and 4.8% had a history of the disease⁽²⁵⁾.

The participants in the current survey, in the majority, reported not engaging in any physical activity. In a study conducted in Paran with 65 HIV-infected patients, it was verified that 64.6% were classified as sedentary⁽²⁶⁾. The importance of performing physical activity among this public is highlighted as a practice that may be associated with the reduction in body fat and lipodystrophy, thus reducing complications such as Diabetes mellitus and hypertension, in addition to contributing to an increase in muscle mass and strength^(27,28).

When the results of nutritional assessment by means of the BMI were compared, it was found that, in a study of 46 HIV/AIDS patients treated at a hospital in Belm, 39.1% were eutrophic, a percentage lower than the result of this study (43.3%). The same study verified that 78.8% were malnourished according to the AC⁽²⁹⁾, a percentage that is close to that found in the current research (89.3%). Another study, developed in Fortaleza with 70 patients undergoing antiretroviral therapy, found a higher percentage of eutrophic patients (60%, n=42) from the BMI, and a lower rate of malnutrition measured from the AC adequacy (55.7%)⁽³⁰⁾.

A variety of factors may influence the nutritional status of individuals with HIV, including the onset of secondary infections and the very use of drug therapy. Studies have shown that the advent of highly active antiretroviral therapy (HAART) has promoted increased cases of eutrophy and overweight in HIV-positive individuals, which may be justified by the ability of some antiretrovirals, such as protease inhibitors, to change the lipid profile and contribute to the appearance of lipodystrophy, in addition to the fact that HAART contributes to increased life expectancy of this public^(31,32). Nevertheless, the current study did not analyze the influence of the HAART study on the nutritional status.

The different studies pointed to a greater number of malnourished patients when evaluated from the AC, a fact also observed in the present study. The circumference is composed of the sum of the bone, muscle, fat and epithelial tissues. Therefore, the decrease in this circumference reflects the loss of protein content, as well as loss of adipose tissue^(33,34).

As in the present study, the agreement between subjective and anthropometric methods was investigated in other studies. A study conducted in Fortaleza with 50 patients of a public hospital, which served patients with different pathologies, found an association between the SGA and anthropometric evaluation ($p=0047$)⁽³⁵⁾. Another study, at a private hospital in Campinas, found no agreement between SGA and BMI⁽³⁶⁾.

Developed in 1987, the SGA was initially created to evaluate surgical patients. Subsequently, its use was extended to individuals with other pathologies, perhaps because this is a simple, easy-to-use tool that, like most screening protocols, does not require the use of equipment⁽¹²⁾. The SGA addresses the existence of weight loss in the past six months, changes in diet, gastrointestinal symptoms, functional capacity, and metabolic stress, in addition to the physical examination, in which the evaluator observes the presence of edema and loss of subcutaneous fat. One of the main disadvantages described in the literature is the tendency to underestimate the proportion of undernourished patients when compared with results of anthropometry⁽³⁷⁾.

Another pertinent issue is that, because of the subjectivity of the method, the evaluator's experience can also influence the diagnostic accuracy⁽³⁸⁾. In addition to the fact that the patient may omit or not recall some information such as the usual weight.

The NRS-2002, a tool created in 1995, takes into account the weight loss within the past three months, reduction in food intake, and disease severity, in addition to the BMI, considering the weight and height measured at admission. The individual is classified from scores regarding the disease severity and the nutritional status. This method, along with the MUST, identified a greater number of patients at nutritional risk, when compared to the SGA. A study developed with patients of a hospital in the city of Recife showed an association between the NRS-2002 and weight loss, but not between the screening protocol and the BMI and AC⁽³⁹⁾.

Similarly to the SGA, the NRS-2002 was initially developed for surgical patients, and later applied to other profiles. Authors emphasize that NRS-2002 shows higher specificity compared to other screening methods⁽⁴⁰⁾.

MUST, the third screening protocol used in this research, is a quick application method, since it consists of only three questions: determination of BMI, percentage of weight loss and presence/absence of fasting for more than 5 days. Another advantage is the indication of the therapy to be followed according to the risk level diagnosed. It is still considered of easy reproducibility and reliability^(12,41).

Like the NRS, MUST also uses the BMI (objective data) as a parameter to evaluate body reserves, unlike the SGA, which is based on nutritional semiology. This difference can possibly have influenced a greater number of patients classified

at nutritional risk by NRS-2002 and MUST. However, measuring the weight and height at the time of admission is not always possible, leading to the use of data informed by the patient or companion, which may result in BMI imprecision.

As a limiting factor for the present study, there is also a lack of patient mobility, as part of the interviewees was not able to walk, which required the use of measures to estimate weight and height. The presence of edema in the lower or upper limbs was also an obstacle to performing the anthropometric measurements.

CONCLUSION

The results of the present study showed that there was an association between the three subjective methods and the assessment using the BMI (body mass index). Nevertheless, NRS-2002 (Nutrition Risk Screening-2002) and MUST (Malnutrition Universal Screening Tool) proved more capable of identifying nutritional risk in comparison to SGA (Subjective Global Assessment). Thus, the use of those two protocols may constitute reliable alternatives in the identification of nutritional risk in patients with HIV/AIDS.

CONFLICT OF INTERESTS

There was no conflict of interest in this article.

REFERENCES

1. Martins TA, Kerr LRFS, Kendall C, Mota RMS. Cenário epidemiológico da infecção pelo HIV e AIDS no mundo. *Rev Fisioter S Func.* 2014;3(1):4-7.
2. Ministério da Saúde (BR), Secretaria de Vigilância em Saúde, Departamento de DST, AIDS e Hepatites Virais. Boletim Epidemiológico HIV - AIDS. Brasília: Ministério da Saúde; 2016. ano V – nº 1
3. Bezerra VP, Serra MAP, Almeida AS, Pereira IL, Chaves RB, Nogueira JÁ. Ações de prevenção do HIV e de Promoção à Saúde no contexto da AIDS pela Estratégia Saúde da Família em João Pessoa-PB. *Ciênc. Cuid. Saúde.* 2016;15(2):343-9.
4. Lemos LA, Fiuza MLT, Pinto ACS, Galvão MTG. Grupo de Promoção da Saúde para portadores do Vírus da Imunodeficiência Humana. *Rev. Enfer. UERJ.* 2013; 21(4): 521-6.
5. Malta DC, Morais OL Neto, Silva MMA, Rocha D, Castro AM, Reis AAC, et al. Política Nacional de Promoção da Saúde (PNPS): capítulos de uma caminhada ainda em construção. *Ciênc Saúde Coletiva.* 2016;21(6):1683-94.
6. Werneck GL, Hasselmann ML, Gouvêa, TG. Panorama dos estudos sobre nutrição e doenças negligenciadas no Brasil. *Ciênc Saúde Coletiva.* 2011;16(1):39-62.
7. Falco M, Castro ACO, Silveira EA. Terapia nutricional nas alterações metabólicas em pessoas vivendo com HIV/AIDS. *Rev Saúde Pública.* 2012;46(6):737-46.
8. Kamimura MA, Baxmann A, Sampaio LR, Cuppari L. Avaliação nutricional. In: Cuppari L. Guias de medicina ambulatorial e hospitalar: nutrição clínica do adulto. São Paulo: Manole; 2014. p. 71-109.
9. Sarni ROS. Avaliação Antropométrica e de composição corporal. In: Silva SMCS, Mura JDP. Tratado de alimentação, nutrição e dietoterapia. 2ª ed. São Paulo: Roca; 2010. p. 147-56.
10. Almeida JC, Kuhmmer R, Sponchiado E, Laflor CM, Weber B. Desenvolvimento de um instrumento de triagem nutricional para avaliação do risco de desnutrição na admissão hospitalar. *Rev Bras Nutr Clín.* 2008;23(1):28-33.
11. Barbosa MRP. Desempenho de testes de rastreamento e avaliação nutricional como preditores de desfechos clínicos negativos em pacientes hospitalizados [tese]. São Paulo: Universidade de São Paulo; 2010.
12. Araújo MAR, Lima LS, Ornelas GC, Logrado MHG. Análise comparativa de diferentes métodos de triagem nutricional do paciente internado. *Comun Ciênc Saúde.* 2010;21(4):331-42.
13. Melo CL. Situação nutricional e caracterização clínica e sócio-econômica dos pacientes soropositivos em uso da terapia anti-retroviral internados em um hospital da Rede Pública Estadual da cidade de Fortaleza-CE [monografia]. Fortaleza: Universidade Estadual do Ceará: Universidade Estadual do Ceará; 2005.
14. Ministério da Saúde (BR). Vigilância Alimentar e Nutricional: orientações básicas para a coleta, processamento, análise de dados e informações em serviços de saúde. Brasília: Ministério da Saúde; 2004.
15. Toledo D, Castro M. Terapia Nutricional em UTI. Rio de Janeiro: Rubio; 2015.

16. World Health Organization. Obesity: preventing and managing the global epidemic. Report of a WHO consultation of obesity. Geneva: WHO; 1997.
17. Blackburn GL, Thornton P A. Nutritional assessment of the hospitalized patients. *Med Clin North Am.* 1979;63(5):1103-15.
18. Conselho Nacional de Saúde (BR). Resolução nº 466, de 12 de dezembro de 2012. Aprova normas regulamentadoras de pesquisas envolvendo seres humanos. *Diário Oficial da União; Brasília; 2012; n. 12, p. 59.*
19. Ferreira RS, Ivo, ML, Uehara SNO, Pontes ERJC, Pelizaro BI, Ferreira Júnior MA. Estado nutricional de pacientes com HIV/AIDS. *Rev Enferm UFPE On line.* 2012;6(6):1321-30.
20. Rodrigues EC, Miranda RNA, Guterres AS. Avaliação nutricional e alimentar de portadores do HIV. *Rev Para Med.* 2013;27(4):37-46.
21. Ladeira POC, Silva DC. Estado nutricional e perfil alimentar de pacientes assistidos pelo Programa de DST/AIDS e hepatites virais de um Centro de Saúde de Itaperuna-RJ. *DST J Bras Doenças Sex Transm.* 2012;24(1):28-31.
22. Simonelli CG, Silva RC. Avaliação nutricional de pacientes vivendo com HIV/AIDS. *Rev Bras Nutr Clín.* 2014;29(2):159-65.
23. Skiest DJ. Focal neurological disease in patients with acquired immunodeficiency syndrome. *Clin Infect Dis.* 2002;34(1):103-15.
24. Kaplan JE, Benson C, Holmes KH, Brooks JT, Pau A, Masur H, et al. Guidelines for prevention and treatment of opportunistic infections in HIV-infected adults and adolescents: recommendations from CDC, the National Institutes of Health, and the HIV Medicine Association of the Infectious Diseases Society of America. *MMWR Recomm. Rep.* 2009; 58(RR-4):1-207.
25. Xavier GA, Cademartori BG, Cunha NA Filho, Farias NAR. Evaluation of seroepidemiological toxoplasmosis in HIV/AIDS patients in the South of Brazil. *Rev Inst Med Trop São Paulo.* 2013;55(1):25-30.
26. Romancini JLD, Guariglia D, Nardo N Jr, Herold P, Pimentel GGA, Pupulin ARG. Níveis de atividade física e alterações metabólicas em pessoas vivendo com HIV/AIDS. *Rev Bras Med Esporte.* 2012;18(6):356-60.
27. Souza HF, Marques DC. Benefícios do treinamento aeróbio e/ou resistido em indivíduos HIV+: uma revisão sistemática. *Rev Bras Med Esporte.* 2009;15(6):467-71.
28. Gouvêa-e-Silva LF, Said MC, Kietzer KS, Freitas JJS, Xavier MB. Nível de atividade física e Síndrome Lipodistrófica em pacientes com HIV/AIDS. *Rev Bras Med Esporte.* 2016;22(2):147-52
29. Pinto AF, Miranda RNA, Kauffmann LKO, Guterres AS, Penha HPS, Fernandez SEM, et al. Estado nutricional e alterações gastrointestinais de pacientes hospitalizados com HIV/aids no Hospital Universitário João de Barros Barreto em Belém, Estado do Pará, Brasil. *Rev Pan-Amazônica Saúde.* 2016;7(4):47-52.
30. Braga LA, Silva CAB. Avaliação nutricional e metabólica de pacientes com HIV em uso de terapia antirretroviral no Nordeste do Brasil. *Rev Bras Promoç Saúde.* 2010;23(4):368-73.
31. Patroclo MAA, Medronho RA. Evolução da contagem de células T CD4+ de portadores de AIDS em contextos socialmente desiguais. *Cad Saúde Pública.* 2007;23(8):1955-63.
32. Jaime PC, Florindo AA, Latorre MRDO, Brasil BG, Santos ECM. Prevalência de sobrepeso e obesidade abdominal em indivíduos portadores de HIV/AIDS em uso de terapia anti-retroviral de alta potência. *Rev Bras Epidemiol.* 2004;7(1):65-72.
33. Ribeiro MMC, Araújo ML, Cunha LM, Ribeiro DMC, Pena GG. Análise de diferentes métodos de avaliação do estado nutricional de pacientes em hemodiálise. *Rev Cuid (Bucaramanga)* 2015;6(1):932-40.
34. Menezes TN, Brito MT, Araújo TBP, Silva CCM, Nolasco RRN, Fischer MATS. Perfil antropométrico dos idosos residentes em Campina Grande-PB. *Rev Bras Geriatr Gerontol.* 2013;16(1):19-27.
35. Sampaio RMM, Pinto FJM, Vasconcelos CMCS. Avaliação nutricional de pacientes hospitalizados: concordância entre diferentes métodos. *Rev Bras Promoç Saúde.* 2012; 25(1):110-5.
36. Merhi VAL, Ravelli MN, Ferreira DVM, Oliveira MRM. Relação de concordância entre avaliação subjetiva global e o Índice de Massa Corporal em pacientes hospitalizados. *Alim Nutr.* 2007;18(4):375-80.

37. Saka B, Ozturk GB, Uzun S, Erten N, Genc S, Karan MA, et al. Nutritional risk in hospitalized patients: impact of nutritional status on serum prealbumin. *Rev Nutr.* 2011;24(1):89-98.
38. Biagulo BF, Fortes RC. Métodos subjetivos e objetivos de avaliação do estado nutricional de pacientes oncológicos. *Comun Ciênc Saúde.* 2013; 24(2):131-44.
39. Lima KVG, Lima LG, Bernardo EMQV, Almeida PAC, Santos EMC, Prado LVS. Relação entre o instrumento de triagem nutricional (NRS-2002) e os métodos de avaliação nutricional objetiva em pacientes cirúrgicos do Recife (Pernambuco, Brasil). *Nutr Clín Diet Hosp.* 2014;34(3):72-9.
40. Vale FCR, Logrado MHG. Estudos de validação de ferramentas de triagem e avaliação nutricional: uma revisão acerca da sensibilidade e especificidade. *Comun Ciênc Saúde.* 2013; 22(4):31-46.
41. Beghetto MG, Manna B. Triagem nutricional em adultos hospitalizados. *Rev. Nutr.* 2008;21(5):589-601.

Mailing address:

Cristiano Silva da Costa
Avenida Augusto dos Anjos, 240/103 - bloco 9
Bairro: Parangaba
CEP 60720-605 - Fortaleza - CE - Brasil
E-mail: cristianocostanutri@gmail.com