

Evaluation of a food acceptance instrument for hospitalized patients in a private hospital network in São Paulo, Brazil

Avaliação de um instrumento de aceitação alimentar para pacientes hospitalizados em uma rede de hospitais privados em São Paulo, Brazil

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ABSTRACT

Introduction: Early detection of malnourishment in hospitalized patients is essential. Poor eating is a risk factor for malnourishment and worsening the prognosis. Therefore, a simple and accurate method to assess food intake should be considered. This study aimed to validate a tool evaluating patients' food acceptance from a major hospital in São Paulo, Brazil. **Methods:** This cross-sectional study included 60 patients of both sexes (73.2±1.8 years old, 56.7% male) at risk for malnourishment. Patients/caregivers filled out the food acceptance evaluation tool. An evaluator verified the food left on trays after meals and compared their responses with those of the patients'. The main reasons for accepting ≤50% of the meals were described. Descriptive statistics for sample characterization and Kappa test agreement were calculated. **Results:** The same answer regarding the acceptance percentage was observed in 78.3% of cases for breakfast and 75.0% for lunch. The main reasons for accepting ≤50% were lack of appetite at breakfast (51.7%) and lunch (36.1%). The Kappa coefficient agreement between patients and evaluator reports on leftovers was $k=0.696$ and 0.692 for breakfast and lunch, respectively. **Conclusions:** Due to considerable agreement, the tool is validated for use with hospitalized adults and elderly in hospitals with the same profile as the institution studied and contributed to elaborate more effective dietary plans specific to the patient's disease and nutritional status.

RESUMO

Introdução: A detecção antecipada de desnutrição em pacientes hospitalizados é essencial. Má alimentação é um fator de risco para a desnutrição e pior prognose. Dessa forma, um método simples e acurado para investigar o consumo de alimentos deve ser considerada. Esse estudo objetivou validar uma ferramenta para avaliar a aceitação alimentar de pacientes em um hospital de referência em São Paulo, Brasil. **Método:** Esse estudo transversal incluiu 60 pacientes dos dois sexos (73,2±1,8 anos, 56,7% homens) sob risco de desnutrição. Pacientes/cuidadores preencheram a ferramenta para avaliação de aceitação alimentar. Um avaliador verificou quanta comida restou na bandeja após as refeições e comparou as respostas com aquelas dos pacientes. As razões principais para aceitação de ≤50% das refeições foram descritas. Estatísticas descritivas para a caracterização da amostra e o teste de concordância de Kappa foram calculados. **Resultados:** A mesma resposta relacionada à porcentagem de aceitação foi observada em 78,3% dos casos no café da manhã e 75,0% no almoço. A razão principal para aceitação de ≤50% das refeições foi a ausência de apetite no café da manhã (51,7%) e almoço (36,1%). O coeficiente concordância de Kappa entre pacientes e relatórios dos avaliadores sobre as sobras foi $k=0.696$ e 0.692 para o café da manhã e almoço, respectivamente. **Conclusões:** Pelo alto grau de concordância, a ferramenta é validada para uso em adultos e idosos hospitalizados em hospitais do mesmo perfil que o hospital estudado, e ela pode contribuir para a elaboração de planos dietéticos mais efetivos e específicos às doenças e estados nutricionais de pacientes.

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INTRODUCTION

Hospitalization is accompanied by several changes in the patients' habitual food intake¹. The acceptance of food during hospitalization is often lower, due to several reasons. These include nausea and lack of appetite resulting from treatments and diseases, as well as the impossibility of eating food, due to physiological changes of aging (dysphagia, sensory alterations in mastication, and salivation), pharmacotherapy (excess medication and its adverse effects), psychological factors, cultural aspects (food customs, religion), changes in eating habits after restrictions and prolonged hospitalizations, dissatisfaction with the preparations offered with regards to the variety of foods, the temperature of the meal when it reaches the bed, the seasonings used, the quality of care provided, and even the unpleasant environment in which meals are eaten¹⁻³.

Malnutrition during hospitalization is a critical and prevalent problem, with approximately 40% of patients worldwide suffering from malnutrition during their hospital stay⁴. This value reaches up to 48.1% in Brazil, with both moderate (35.5%) and severe (12.6%) malnutrition being present among patients⁵.

Nutritional screening is essential among hospitalized and malnourished patients, but it can often be overlooked, directly interfering with their prognosis and recovery⁶. Malnourished patients, especially those who consume $\leq 50\%$ of meals, have a greater risk of a decline in nutritional status and a more extended stay, resulting in higher healthcare costs⁷. Considering the prevalence and risks associated with malnutrition, there is a need to monitor intake accurately.

Early detection of nutritional risk is essential, since, in the initial stages, malnutrition can be prevented and controlled through dietary intake containing the necessary energy and nutritional support⁸. Nutritional risk in hospitalized patients can be assessed using nutritional screening instruments, which are often quick and easy to use^{8,9}. Structured questions administered by researchers and healthcare professionals represent the format of these instruments. They are often associated with weight status, weight loss, and other conditions related to the patient's underlying diseases⁸.

A few instruments are proposed to assess the food acceptance of hospitalized patients at nutritional risk, but these instruments are only developed in high-income countries^{7,8,10-12}. In many lower-middle-income countries, such as Brazil, instruments to assess the food acceptance of hospitalized patients are scarce. The development of validated questionnaires is an opportunity to aid the evaluation of patients' food intake and acceptance. Therefore, the objective of this study was to evaluate the validity of a food acceptance instrument for patients admitted to a private hospital in the city of São Paulo, Brazil.

METHODS

This is a cross-sectional study conducted in a private hospital in the city of São Paulo, Brazil. The study was approved by the Research Ethics Committee (CAAE no. 64347517.3.0000.5461), and all participants signed an informed consent form before participating in this study. The study is reported by the STROBE-Nut guidelines, as it is a cross-sectional study¹³.

We ran this study between June 2019 and August 2020. We included patients of both sexes, aged 18 years old or older, hospitalized for more than 24 hours, who were at nutritional risk according to the NRS-2002 protocol (Nutritional Risk Screening)^{14,15}, who were receiving oral intake/association with the enteral route (i.e., tube or ostomy), and who were exclusively on a hospital diet. Among the participants who, for some reason, could not complete the instruments, the respective companions filled them out. Patients in contact isolation and/or who were in palliative care were excluded from the study. In addition, patients in outpatients' units, under sleep medicine, video electroencephalogram, radioiodine therapy, and in pediatric units were excluded from the study.

The NRS-2002 tool assesses the risk of malnutrition during hospitalization, and is designed to be applied within 72 hours of admission¹⁴. Nutritional risk is assessed using three items: (i) body mass index (BMI) ≤ 20 kg/m²; (ii) reduced dietary intake in the last week; and (iii) severely ill patient (e.g., intensive care). After the questions, a score is created to classify the nutritional risk into mild (score = 1), moderate (score = 2), and severe (score = 3).

By convenience sampling, 60 patients at nutritional risk were selected during the data collection period and in numerical order of the beds in all hospitalization units to validate the "Food Acceptance Assessment Instrument" (Box 1). The participants and/or caregivers completed the instrument according to the patient's food consumption. A duly trained clinical nutritionist compared all the completed questionnaires with the food left on the patient's tray after the kitchen staff had removed breakfast and lunch. Dinner was not evaluated, as it was a proxy for lunch at the hospital.

For the elaboration of the instrument, a committee with an odd number of professionals was created, where each item was evaluated in terms of clarity and importance. The development of the instrument encompassed seven phases, described below: (i) creation of a committee of researchers and professionals in the medical field and clinical and hospital nutrition; (ii) development of a semi-structured interview; (iii) evaluation of the interview content by a group of experts in the field; (iv) development of instrument domains; (v) development of items for each domain; (vi) application in a pilot sample to verify the instrument's clarity and pertinence (with an odd number of participants); and (vii) instrument adjustment.

Avaliação da Aceitação Alimentar de Pacientes internados

Etiqueta do paciente

Após o café da manhã e almoço, marque um "X" na opção que mais se aproxima do quanto foi ingerido de tudo o que foi enviado na bandeja.

Solicitamos que anote as informações abaixo e devolva ao copeiro quando o almoço for retirado.

Data: ___/___/___

Dieta: _____

CAFÉ DA MANHÃ

Comeu tudo	Mais da metade	Metade	Menos da metade	Nada

Caso a opção assinalada tenha sido "metade", "menos da metade" ou "nada", justifique:

- Enjôo ou vômito
- Falta de apetite
- Cansaço
- Tinha muita comida
- Não gostou da comida
- Não gostou do cheiro da comida
- Dificuldade para mastigar ou engolir
- Outros _____

Guardou algum alimento servido? Sim Não

ALMOÇO

Comeu tudo	Mais da metade	Metade	Menos da metade	Nada

Caso a opção assinalada tenha sido "metade", "menos da metade" ou "nada", justifique:

- Enjôo ou vômito
- Falta de apetite
- Cansaço
- Tinha muita comida
- Não gostou da comida
- Não gostou do cheiro da comida
- Dificuldade para mastigar ou engolir
- Outros _____

Guardou algum alimento servido? Sim Não

Food Acceptance Assessment in Hospitalized Patients

Patient Behavior

After breakfast and lunch, mark an "X" in the option that comes closest to how much was ingested from everything that was sent on the tray.

We ask that you fill out the information below and return it to the attendant when lunch is removed.

Date: ___/___/___

Diet: _____

BREAKFAST

Ate everything	More than half	Half	Less than half	Nothing

If the checked option was "half", "less than half" or "nothing", justify:

- Nausea or vomiting
- Lack of appetite
- Tiredness
- There was a lot of food
- Did not like the food
- Did not like the smell of the food
- Difficulty chewing or swallowing
- Others _____

Did you keep any served food? Yes No

LUNCH

Ate everything	More than half	Half	Less than half	Nothing

If the checked option was "half", "less than half" or "nothing", justify:

- Nausea or vomiting
- Lack of appetite
- Tiredness
- There was a lot of food
- Did not like the food
- Did not like the smell of the food
- Difficulty chewing or swallowing
- Others _____

Did you keep any served food? Yes No

The flowchart (Figure 1) for completing the “food acceptance assessment tool” showed five steps described below: (i) identification of the patient participating in the study, conducted by the nutritionist responsible for the floor, by the inclusion criteria of the study mentioned above, and guidance on filling in and the importance of the accuracy of the information; (ii) the nutritionist on the floor identified the instruments using patient labels, informing the kitchen staff and including the instrument on the breakfast and lunch trays; (iii) patient received the instrument along with the breakfast tray and completed it after this meal and lunch concerning

food acceptance (accurately following the guidelines); (iv) the trained professional checked the food left over on the patients’ trays after breakfast and lunch, and also filled out the instrument, in order to compare it with the data in the instrument filled out by the patient/companion.

The independent variables were the characteristics of the patients, and included the patient’s gender, age, reason and unit of admission, nutritional status, and type of diet. The dependent variables, in turn, were related to the “Instrument for the Assessment of Food Acceptance” and the food leftovers on the patient’s tray at a given meal. In questions related to the

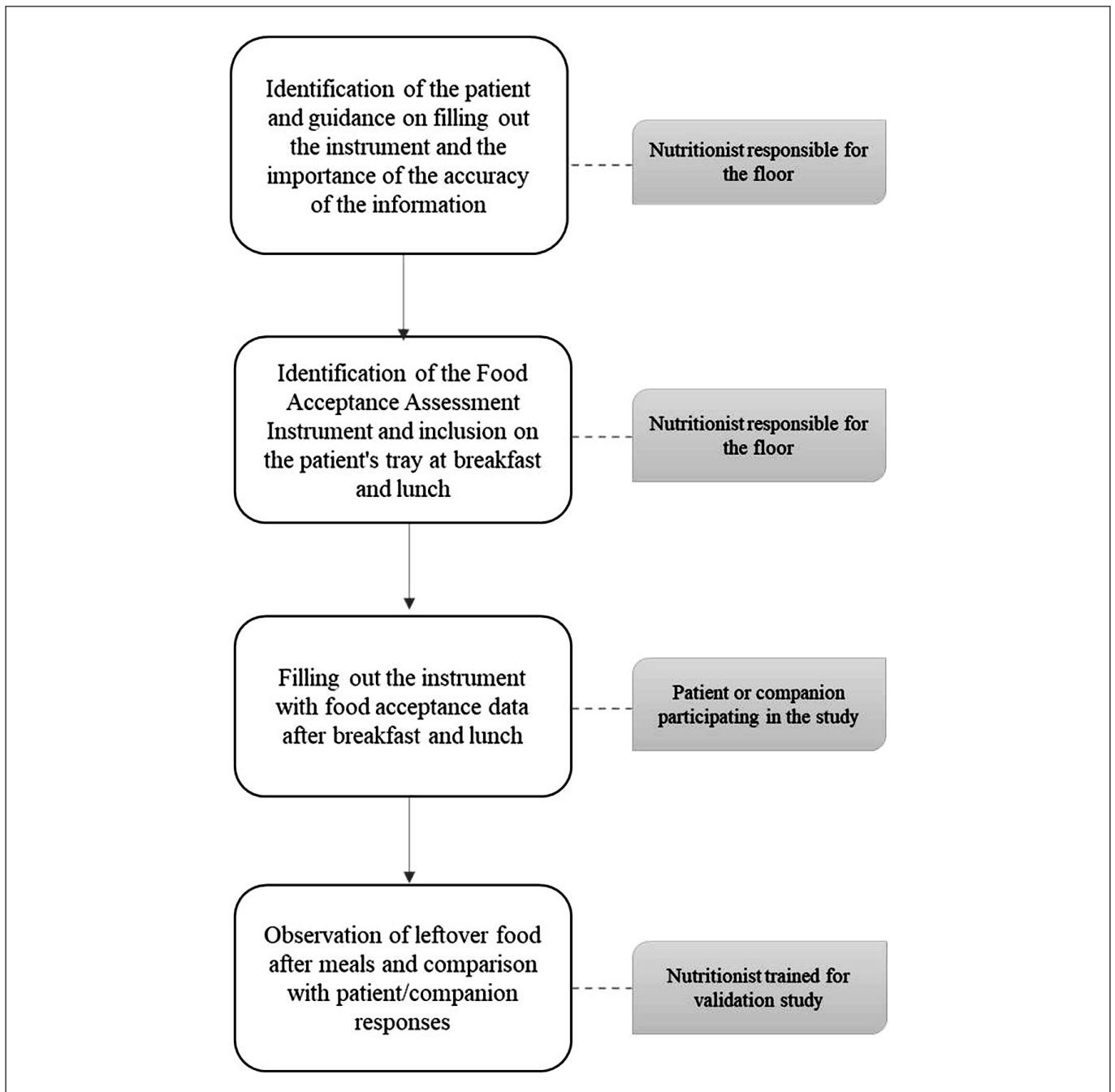


Figure 1 - Validation flowchart of the “Food Acceptance Instrument”.

instrument, food acceptance by the patient was reported, the reason for accepting $\leq 50\%$ of what was served, and whether any food was kept in the room. Food acceptance was considered excellent at 100% consumption ("ate everything"), good food acceptance at 75% consumption ("more than half"), regular food acceptance at 50% consumption ("half"), poor food acceptance at 25% of consumption ("less than half"), and zero food acceptance at 0% ("nothing").

Descriptive statistics of data for sample characterization were used, including mean (\pm standard deviation) for continuous variables and frequency (percentage) for categorical variables. The agreement between the patient/companion's acceptance responses versus those observed by the evaluator was obtained by the Kappa coefficient. Values of "0" indicated no agreement, 0.01-0.20 indicated none-low, 0.21-0.40 indicated fair, 0.41-0.60 indicated moderate, 0.61-0.80 indicated considerable, and 0.81-1.00 almost perfect agreement¹⁶. Data were stored in an Excel database (2016 MSO version), and analyses were performed in the SPSS statistical program (Version 22.0, Armonk, IBM Corp).

RESULTS

Sixty eligible patients consented to participate in the study. The mean age was 73.23 ± 1.77 years old. In our dataset, 56.67% of patients were male, 31.67% were eutrophic, and

30.0% were overweight or obese (Table 1). For each hospitalization unit, there was at least one hospitalized patient. The units were the medical clinic, gastroenterology clinic, gastroenterology surgery, orthopedics surgery, general surgery, oncology, bone marrow transplantation, semi-intensive care unit, general critical care unit, coronary care unit, and intensive care unit.

Table 2 and Figure 2 show patient responses regarding food acceptance, evaluator responses regarding food leftovers at breakfast and lunch, and the number of patients who kept food

Table 1 – Characterization of the sample in relation to age, sex, and nutritional status.

Variables	Mean	\pm Standard Deviation
Age years	73,22	± 13.72
BMI, kg/m ²	25.11	± 5.72
Sex		
Female	26	43.33
Male	34	56.67
Nutritional status¹		
Underweight	23	38.83
Eutrophic	19	31.67
Overweight	8	13.33
Obesity	10	16.67

¹Nutritional status classified according to PAHO, 2002 (≥ 60 years old) and WHO, 1998 for adults (20 to 59 years old)

Table 2 – Patient responses regarding food acceptance vs. evaluator responses regarding food leftovers at breakfast and lunch.

Food Acceptance	Patient		Evaluator		Response Agreement Breakfast	Response Agreement Lunch
	Breakfast	Lunch	Breakfast	Lunch n (%)	Reference (yes)	
Zero (0%)	---	5 (8.3)	---	4 (6.7)	47 (78.3%)	45 (75.0%)
Bad (25.0%)	11 (18.3)	11 (18.3)	8 (13.3)	16 (26.7)		
Regular (50.0%)	10 (16.7)	15 (25.0)	7 (11.7)	10 (16.7)		
Good (75.0%)	19 (31.7)	21 (35.0)	24 (40.0)	22 (36.7)		
Great (100.0%)	20 (33.3)	8 (13.3)	21 (35.0)	8 (13.3)		

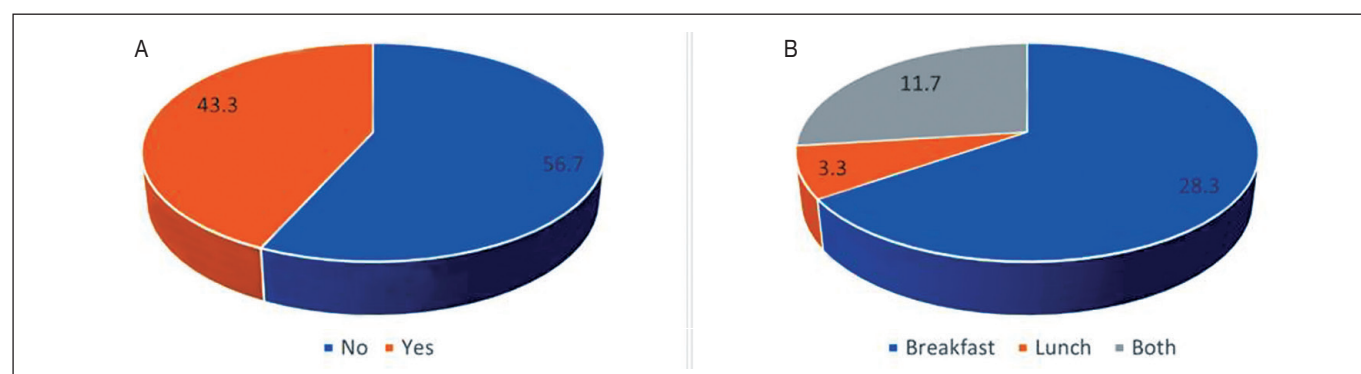


Figure 2 - Patient kept food (a) and from which meals (b) the food was kept.

in their rooms. Most patients (n=20, 33.3%) reported excellent food acceptance for breakfast. For lunch, most (n=21, 35%) reported good acceptance. For the evaluator, good food acceptance prevailed for breakfast (n=24, 40%) and lunch (n=22, 36.7%). The same response from the patient and the evaluator regarding the percentage of food acceptance was observed in 78.3% of the cases for breakfast and 75.0% for lunch. Among the patients, 26 (43.3%) recorded that they kept food in the room, and breakfast (n=17, 28.3%) was the meal in which the participants kept food the most. The main reasons for food acceptance $\leq 50\%$ at breakfast and lunch were lack of appetite for 15 (51.72%) and 13 (36.11%) patients, respectively, followed by "there was a lot of food" by 5 (17.24%) and 8 (22.22%) patients, respectively (Figure 3).

Table 3 shows the Kappa coefficient of agreement between the patients' and evaluators' reports regarding food acceptance. Again, a considerable level of agreement was observed, with 0.696 for breakfast and 0.692 for lunch.

Table 3 – Agreement between patient and evaluator regarding food acceptance per meal according to the Kappa coefficient.

Patient	Breakfast		Lunch	
	Evaluator	Kappa Coefficient	Evaluator	Kappa Coefficient
Zero (0%)	---		100%	
Bad (25.0%)	100%		56%	
Regular (50.0%)	86%	0.696	80%	0.692
Good (75.0%)	67%		86%	
Great (100.0%)	81%		75%	

DISCUSSION

The present study fills a gap in the development and validation of an instrument to assess food acceptance in adults and elderly individuals hospitalized in a large, private hospital in the city of São Paulo. The food acceptance reported by the patient/companion and the verification of food leftovers by the evaluator showed considerable agreement. Furthermore, 43.3% of the patients kept leftover food on trays in their rooms. These results suggest that the food acceptance instrument and food leftovers, when combined with careful inspection by a clinical nutritionist, knowledge of personal characteristics (e.g., sociodemographic data), underlying disease, and nutritional status of the patient, can potentially provide viable data for use in the nutritionist's clinical approach. However, the use of the instrument requires prior training of the professional who is applying it, as well as patient orientation, in order to help him/her report the information correctly, avoiding possible errors¹⁰.

During the hospital routine, it is common for the kitchen or nursing staff to record food intake, and nutritionists depend on this information to formulate the patient's dietary plan. However, due to the roles of other professionals during care, delays may occur in the collection of these records, leading to biases in the report and incorrect data¹⁷. The design of the present study allowed for the assessment of acceptance and food leftovers from main meals. Alternatively, a study with 15 hospitalized Australian patients (mean age 77 ± 8 years old, 60% female) found low agreement between the reports of patients and professionals regarding the instruments for assessing food consumption¹⁷. Therefore, it is suggested that records completed by professionals, as part of their usual care routine, with no prior training, may not accurately measure patient response.

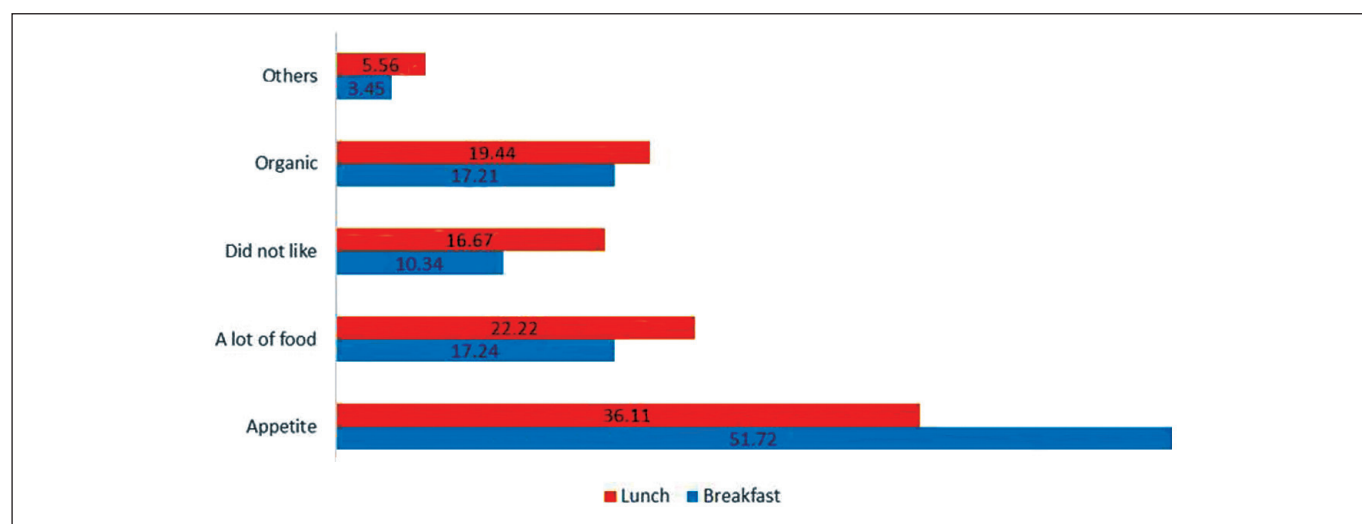


Figura 3 - Reasons for regular; poor; or no food acceptance by patients for breakfast and lunch.

Note: Organic: swallowing problems, nausea/vomiting, and tiredness.

Others: high anxiety, going to eat later, eating infrequently, being sick of the food.

Limitations while filling out the instrument by patients only exist among those physically and cognitively incapable of answering the questionnaire¹⁸. Therefore, training is needed to use this tool, not only for the patient, but also for all companions who are involved in care.

Tulloch et al.⁷ aimed to verify the ability to provide accurate estimates of patients' food intake through visual assessment of meals on trays in an intensive care hospital in Canada. The results showed that the hospital food service could accurately estimate patient intake, contributing to an important marker in detecting malnutrition.

The current study has strengths. First, the sample size was relatively adequate for validation studies, with epidemiological validation studies recommending a sample of at least 50 participants¹⁹. In addition, some precautions were considered to address the limitations of methods to assess patient diet, such as the basic training of the professional who assessed the dietary acceptance of patients concerning food leftovers in the tray after meals²⁰. The present study also collected patient data, allowing the assessment of evaluator agreement. However, the instrument's reproducibility was not evaluated, as most patients were only assessed once. More specifically, the measurement of the same instrument with the same patient was not collected after at least 15 days. However, due to the larger sample of patients obtained from each inpatient unit, reproducibility might not be necessary^{21,22}. Other limitations include the sample being heterogeneous in diagnoses and types of diet, and homogeneous in socio-demographic characteristics (higher prevalence of elderly and male gender) as well as nutritional status (i.e., malnutrition). Furthermore, the amount of food kept in the room was not measured, nor was the consumption of that food verified.

CONCLUSION

The instrument developed is valid for assessing the food acceptance of adult and elderly patients hospitalized in private hospitals with the same profile as the institution studied, as it presented a considerable level of agreement. This will contribute to elaborating more effective dietary plans for patients according to their underlying pathology and nutritional status. It also allows for a more accurate assessment of patients who are weaning from enteral nutrition or are about to remove feeding tubes. Future research should consider including this assessment in children and adolescents, and associate it with specific actions adapted for use by nutritionists in outpatient clinics and home care.

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Study location: Hospital Sírio-Libanês, São Paulo, SP, Brazil.

Conflict of interest: The authors declare that there are none.