

## Validation of the Persian-Translated NutritionDay Questionnaire

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### ABSTRACT

**Introduction:** Hospital malnutrition is a widespread health problem. Most studies on hospital malnutrition used different validated screening tools to determine malnutrition and the nutritional status of patients. Therefore, it is not possible to compare the prevalence of malnutrition among wards and hospitals. The nutritionDay project is a one-day, cross-sectional audit run in healthcare institutions. The nutritionDay hospital questionnaires are available in more than 30 languages and it includes 4 sheets focused on hospital structure, ward structure/processes, patient's clinical condition, patient's nutritional status, and 30-day outcome. For the first time, we analyzed to prove the validity and reliability of the Persian translation of the nutritionDay questionnaires.

**Method:** At first, two separate people did the questionnaire's translation into Persian and re-translation into English. Then, the translation was sent to 15 experts to assess content validity. The validity of the questionnaire was evaluated by checking relevance, clarity, simplicity, and importance score. Questions with a content validity ratio (CVR)>0.49 were accepted. The average technique was used to calculate the content validity index (CVI). Also, Cronbach's alpha coefficient and test-retest couldn't be calculated for reliability assessment due to the variety of variables and the nature of the nutrition questionnaire .

**Result :** Overall, the CVR of all questions was above 0.49. Also, the CVI-Relevancy, CVI-Clarity, CVI-simplicity, and Importance scores of the final tool were 0.98, 0.99, 0.99, and 4.69 respectively .

**Conclusion :** This Persian translated nutritionDay questionnaire demonstrates strong content and face validity. Furthermore, it can be an appropriate tool for evaluating patients' clinical conditions and nutritional status.

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## Introduction

Malnutrition is a nutritional disorder caused by the decrease or imbalance in energy, protein, vitamin, and mineral intake (1). Malnutrition is associated with higher mortality, increase risk of comorbidity, longer hospital stays, increase readmissions, and health care costs (2). Malnourished people are exposed to a higher severity of malnutrition if hospitalized. Also malnutrition leads to a decrease in the level of immunity system (3). Hospital malnutrition is a widespread health problem that affects 30-50% of patients (2). In the previous decades, studies have shown that the prevalence of diseases related malnutrition in patients is 20-40%, with a higher prevalence in elderly or cancer patients and patients suffering from neurological disorders (4). A recent study published in 2013 showed that the prevalence of malnutrition was over 63.1% in the patients admitted to chest and general medicine wards of a teaching hospital in Iran (5). There are valid nutritional screening tools to assess risk of malnutrition in hospitalized patients including NRS-2002, MNA, SGA, and GLIM (6, 7, 8, 9, 10, 11). The use of different screening tools leads to different reports of malnutrition prevalence in the same situations. So the comparison of different wards is not possible.

nutritionDay (nDay) is a global action to monitor and benchmark malnutrition in health centers (2). In the nutritionDay project, data is collected anonymously from hospitals, nursing homes, and intensive care units using nDay questionnaires. The nDay questionnaire is used as standard tool for defining nutritional behavior and nutritional status of the nursing home population and of hospitalized patients (4). nutritionDay questionnaire is a simple tool that doesn't require specialized knowledge. In 2004, a specialized working group from ESPEN led by Prof. Michael Hiesmayr proposed a cross-sectional nutritionDay to evaluate food intake and nutritional care in European hospitals. The first year of nutritionDay was held on 19th January 2006 with 14950 patients from 747 departments, 259 hospitals, and 25 countries (4). The nutritionDay was started with the support of the Austrian Society for

Clinical Nutrition (AKE), the Medical University of Vienna. Informed consent of patients is also collected. The nDay study is annually approved by the ethics committee of the Medical University of Vienna (4). nutritionDay hospital questionnaire included 4 separate sheets. Sheet 1a/b contains questions related to the structure and organizational information of the ward, and it is completed once for each ward. Sheet 1c contains questions related to the hospital's capacity and structure and is completed once for each hospital. Sheet 2a/b collects information regarding patient's clinical conditions during hospitalization. Sheet 3 a/b reports on patient's eating habits change, recent food intake, and self reported health status. Sheet 2a/b and Sheet 3 a/b are completed for each patient by the unit staff (12). Outcome assessment is examined 30 days after nutritionDay using a specific questionnaire that includes discharge, death, length of hospital stay, transfer to other hospital or long term care (4).

Hospital questionnaires have been translated in more than 30 languages to include all patients present in the ward at nDay. Translations have been provided by the nutritionDay national coordinators in each participating country.

The aim of the current study is the evaluation of the validity and reliability of the Persian translation of the nutritionDay questionnaire for the evaluation of malnutrition and nutritional status of patients in the ward.

## Materials and Methods

The present study was conducted in 2022 at Mashhad university of medical sciences. At first, two separate people did the questionnaire's translation and re-translation. This version was compared with the original questionnaire and the necessary modifications were applied. All steps were performed by two people fluent in Persian and English. The final content of the Persian questionnaire was discussed among an expert panel including experts in clinical nutrition, epidemiology, and social medicine as well as general practitioners.

Content validity, Face validity, and Reliability were evaluated for each question.

### Validity

Validity is defined as the extent to which the explanation of a test result is reliable (13). In general, one of the types of validation is content validity. The content validity is based on the opinion of a group of experts in the relevant fields (14).

This study used experimental methods to calculate the content validity ratio (CVR) and content validity index (CVI) (15, 16). To determine the CVR, experts were asked to determine the presence or absence of necessity for each question. The score of CVR varies between 1 and -1. A high score CVR demonstrates more consensus among the panel members regarding the necessity of the question. The CVR formula is  $CVR = (N_e - N/2) / (N/2)$ , where  $N_e$  indicates the number of experts who chose the necessary option and  $N$  is the total number of experts. The numerical value of CVR was determined by Lawshe Table (16). In this study, questions with a  $CVR > 0.49$  were accepted. The content validity index (CVI) is the common criterion for valid content (16). About 15 experts were asked to evaluate relevancy, clarity, simplicity, and importance score of each question. Table 1 was designed for all questions to facilitate experts' answering.

The content validity index is classified into two types, including S-CVI and I-CVI (16). The proportion of total questions in the questionnaire that were rated 3 or 4 by experts is called S-CVI. Instead, the I-CVI shows the ratio of agreement about the relevance of each question (16).

There are two techniques for calculating S-CVI. One approach needs universal agreement (UA) between experts (S-CVI/UA) while the second technique, refers to the average CVI (S-CVI/Ave) with a less conservative approach. In this study, we used the average technique. Average technique is calculated by the total I-CVI divided by the total number of questions. The decision on each question is based on the following criteria: questions whose I-CVI was greater than 79% were accepted. If it was between 70-79%, they were revised and if it was less than %70, they were removed (16).

Face validity is an objective judgment regarding the structure of the questionnaire

(17). Quantitative and qualitative methods were used to determine the face validity of the questionnaire (18). The experts were asked to rate the questions according to their importance based on a 5-point Likert scale from 1 to 5, where 5 represents the highest importance of the questions. Finally, to calculate the importance score, the relative frequency was multiplied by the various scores on the Likert scale (18). If the importance score for one question is equal to or higher than 1.5, it is maintained in the questionnaire and if it is less than 1.5, it will be removed from the questionnaire.

### Reliability

Test-retest reliability was performed by running a test for the same group of respondents at 2 points in time with an interval of 2 weeks (19). The correlation between the 2 scores shows the stability of the respective questionnaire (19). A reliability coefficient is a number between zero and one, where zero indicates no reliability and one indicates 100% reliability (20). The methods used to measure the reliability of the questionnaire are different. Cronbach's alpha coefficient is used to show internal consistency reliability. Internal consistency shows how well the questions in the questionnaire are conceptually consistent (20, 21, 22, 23) Cronbach's alpha should be at least 0.7 or more. Questions whose Cronbach's alpha value is less than 0.7 are removed from the questionnaire. (20, 21, 24) The formula for determining Cronbach's alpha is as follows :

$$\alpha = \frac{k}{k-1} \left( 1 - \frac{\sum S_i^2}{S_t^2} \right)$$

In this formula,  $k$  indicates the number of questionnaire items,  $S_i^2$  indicates the variance of item  $i$ , and  $S_t^2$  indicate the variance of the total questionnaire (25,26). Also, test-retest was used to determine the reliability of the questionnaire. In this method, the questionnaire was completed twice for the goal group and the scores were compared. The most common method to find the correlation between scores is to calculate the Spearman-Brown correlation coefficient, the most acceptable test to determine the stability of the interclass correlation test (27,

28). If this index is 0.8 it is found acceptable (29).

In this study, it was not possible to calculate Cronbach's alpha because the responses to different questions were not equal. Also, the test-retest is used in situations where the variable can't be changed within a period of specific time which is usually considered as 2 weeks. According to the nature of the nutritionDay questionnaire which monitors the clinical and nutritional condition of the patient, the questions will have different answers. So we assumed that the test-retest method will not provide accurate data for assessing reliability in this study.

Data were entered in Microsoft Excel 2022. We used a researcher-made template in the aforementioned software to calculate CVR, CVI (in three domains), and importance score.

### **Ethics**

This study was approved by the Ethics Committee of "removed for blind peer review" (IR.MUMS.MEDICAL.REC.1401.481).

### **Results**

After conducting content validity and face validity, the nutritionDay questionnaire was accepted without any changes with a total of 64 questions. All opinions of the expert panel regarding the CVR, CVI-relevancy, CVI-Clarity, CVI-Simplicity, and Importance score of the questions were collected in 8 weeks (Response rate =100%). All questions had a cutoff point above 0.49 in terms of CVR. The CVI-relevancy, CVI-Clarity, CVI-Simplicity, and Importance scores of the final tool were 0.98, 0.99, 0.99, 4.69 respectively. Table 2-5 demonstrates the CVR, CVI-relevancy, CVI-Clarity, CVI-Simplicity and Importance score of each question.

### **Discussion**

#### **Statement of principle finding**

In this study, the Persian version of the nutritionDay questionnaire was found to be valid for the assessment of the patients nutritional status, for the first time. This questionnaire has excellent validity although, due to the nature of the questionnaire, it was not possible to evaluate its reliability. The

matter is mentioned that all questions in the validated malnutrition questionnaires (including NRS-2002, PG-SGA, and MUST) be covered in the nutritionDay questionnaire. There is no single questionnaire for the nutritional assessment of patients in Iranian hospital centers.

One of the best methods to determine the validity of the content is the Lawshe method. The content validity was performed by a group of 15 experts, and according to the studies, the number of 5 to 10 experts is sufficient (30). CVR above 0.49 was accepted based on the total opinions of experts. therefore, all questions were accepted.

The aim of the current study is the evaluation of validity and reliability of the Persian translation of the NutritionDay questionnaire. Considering that the questions have different answers at any time, they are not valid enough to measure in 2 time periods. Therefore, reliability was not possible. Actually, the nature of our tool was a checklist.

This study helps nutritionist in healthcare settings to utilize a dependable tool for investigating hospital malnutrition and enhancing patient outcomes, given the significance of investigating hospital malnutrition and monitoring patient's nutrition status.

#### **Strength and limitation**

This tool has international applicability and the results it provides are crucial. As a strength of the present study can be mentioned that it is the first time that the complete process of validity is done in a non-English language for this tool. The main limitation of our study can be implied to that According to the variety of variables, the nature of the nutritionDay questionnaire, and the clinical and nutritional condition of the patient, reliability was not possible.

#### **Conclusion**

This persian translated nutritionDay questionnaire illustrate strong content and face validity. Assessing the nutritional and clinical state of patient with this instrument can be a crucial measure in improving their clinical outcome.

**Table1.** The table designed for each question to facilitate the scoring by the expert.

CVR	1: Essential	2: Useful but unessential	3: Not essential	
<b>Relevancy</b>	4: Totally relevant	3: Relevant but needs minor changes	2: Need come changes	1: irrelevant
<b>Clarity</b>	4: Completely clear	3: Clear but needs minor changes	2: Need come changes	1: Not clear
<b>Simplicity</b>	4: Completely simple	3: Simple but needs minor changes	2: Need come changes	1: Not simple

Score from 1 to 5 based on importance (1: less important, 5: high important)

**Table 2.** Content validity for SHEET 1a/b and 1c (related to the structure, organizational information of the ward and hospital's capacity and structure), Persian version of NutritionDay questionnaire.

Number	CVR	CVI-relevancy	CVI-Clarity	CVI-Simplicity	Importance score
1	1	1	0.93	1	4.6
2	0.87	1	1	1	4.3
3	0.87	1	1	1	4.3
4	0.60	0.86	1	1	4.4
5	1	1	1	1	4.8
6	1	1	1	1	4.9
7	1	1	1	1	4.8
8	1	1	1	1	4.9
9	0.87	1	1	1	4.7
10	0.87	1	0.86	0.93	4.7
11a	0.87	1	1	0.93	4.6
11b	0.73	1	1	0.93	4.8
12	1	1	1	1	4.8
13	0.73	1	1	1	4.8
14	0.73	1	1	0.93	4.6
15	0.87	0.93	1	1	4.7
16	0.73	1	1	1	4.8
17a	0.87	1	1	1	4.6
17b	0.87	1	1	1	4.6
18	0.60	1	1	1	4.5
19	0.73	1	1	1	4.6
1c					
1	0.87	0.93	1	1	4.6
2	0.87	0.93	1	1	4.6
3	0.87	1	1	1	4.8
4	1	1	1	1	4.8
5	1	1	1	1	4.8
6	1	1	1	1	4.9

\*The number of the question among standard nutritionDay questionnaire (12)

**Table 3.** Content validity for SHEET 2a/b (related to information regarding the patient's clinical condition during hospitalization), Persian version of NutritionDay questionnaire.

2a/b	CVR	CVI-relevancy	CVI-Clarity	CVI-Simplicity	Importance score
1	0.87	0.93	1	1	4.6
2a	1	1	1	1	4.8
2b	1	1	1	1	4.8
3	1	1	1	1	4.8
4a	0.87	1	1	1	4.6
4b	1	1	1	1	4.6
5	0.87	0.93	1	1	4.7
6	0.87	1	0.93	1	4.8
7	0.87	1	1	0.86	4.7
8	0.60	0.93	1	1	4.9.
9	1	1	1	1	4.6
10	0.87	1	1	1	4.8
11	0.87	1	1	1	4.7
12	1	1	1	1	4.7
13a	1	1	1	1	4.8
13b	1	1	1	1	4.8
14	1	1	1	1	4.8
15a	1	1	1	1	4.7
15b	1	1	1	1	4.7
16	0.87	0.93	1	0.86	4.6

**Table 4.** Content validity for SHEET 3a/b (related to the eating habits change, recent food intake, and patients' insight from their health status), Persian version of NutritionDay questionnaire

3a/b	CVR	CVI-relevancy	CVI-Clarity	CVI-Simplicity	Importance score
1	1	1	1	1	4.8
2	0.73	1	1	1	4.4
3	0.73	0.93	1	1	4.6
4	0.60	0.93	0.93	1	4.6
5	0.60	1	1	1	4.6
6	0.60	1	1	1	4.2
7	0.60	1	1	1	4.3
8	0.60	1	1	1	4.3
9a	1	1	1	1	4.7
9b	1	1	1	1	4.7
10	0.60	0.86	1	1	4.2
11	1	1	1	1	4.7
12	1	1	1	1	4.7
13	0.73	1	1	1	4.4
14	0.87	1	1	1	4.8
15	0.73	1	0.93	1	4.3
16a	1	1	1	1	4.8
16b	1	1	1	1	4.8
17	1	1	1	1	4.8
18	1	1	1	1	4.6
19a	1	1	1	1	4.8
19b	1	1	1	1	4.8
20	1	1	1	1	4.4
21	0.73	0.93	1	1	4.6
22	0.60	0.93	1	1	4.6
23	0.60	0.8	0.93	1	4.3

**Table 5.** Content validity for SHEET COVID-19 and SHEET 30-days OUTCOMES, Persian version of NutritionDay questionnaire.

Covid-19	CVR	CVI-relevancy	CVI-Clarity	CVI-Simplicity	Importance score
1	0.73	1	1	0.93	4.6
2	0.73	1	1	1	4.5
3	0.60	1	0.93	1	4.6
30-days outcomes					
1	1	1	1	1	4.9
2	1	1	1	1	4.9
3	1	1	1	1	4.8

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