

**Development and validation of a questionnaire to evaluate the state of Iranian hospital nutrition support**

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Abstract

Background: Recently, nutrition support was implemented as a part of clinical services in hospitals. The implementation of nutrition support needs to be assessed for its improvement.

Objective: This study aimed to develop and validate a questionnaire to assess the state of nutrition support in Iranian hospitals.

Methods: A mixed method approach was used in this study. This study was performed in training hospitals of Iran in 2016. In the development stage, pre-determined keywords were searched on international electronic databases. Additionally, semi-structural interviews were performed with 13 key informants based on purposive sampling. Themes were extracted from articles and interviews by thematic analysis. A primary questionnaire was generated based on extracted themes. In the validating stage, the content validity ratio (CVR) and content validity index (CVI) were used. The reliability of the questionnaire was also computed through a pilot study using Cronbach's alpha test. SPSS version 16.0 was used for data analysis.

Results: Based on 16 items elicited from the content analysis, 110 questions were generated, out of which, 65 questions were selected. Then, 55 questions showing acceptable CVI and CVR were chosen for the pilot study. The Cronbach's alpha coefficient of the questionnaire was found to be 0.80. This value remained stable for each item, even after an item was deleted.

Conclusion: For the first time, a validated questionnaire for the assessment of the state of nutrition support in hospitals was developed in a methodological approach process with high validity and reliability indexes which intended to be comprehensive based on the mixed method approach.

Keywords: Nutritional Support, Hospitals, Surveys and Questionnaires

1. Introduction

Malnutrition is a common problem in hospitalized patients due to lack of appetite, low energy and protein intake, high energy requirement and inflammation. Most hospitalized patients are at risk of malnutrition during their hospital stay. Malnutrition leads to an increase in morbidity, mortality and length of stay (1-3). The prevalence of malnutrition has been reported to be 19 to 60% (4-8). Studies show malnutrition prevalence in Iranian hospitals is about 48.1% to 60 % (9-12). In recent years, malnutrition management has been considered as a main goal in clinical patient care standards (13). Nutrition support is implemented in hospitals as a part of the clinical services according to the instructions established regionally for each country (14). Nutrition support instruction (NSI) has been implemented in the Islamic Republic of Iran since 2012. According to the instruction, nurses should screen all

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patients with the nutritional screening tool at admission. The nutrition assessment should be performed by dietitians for patients identified to be nutritionally at risk during the nutrition screening process or nutritional consultation. Following the nutrition assessment, diet adjustment, nutrition therapy, and patient education should be performed (15). Assessment is an essential stage of a health policy, which is used to make judgments about the quality or effectiveness of a program, improve its performance, and show its development (16). To improve the implementation of nutrition support, it should be evaluated after the implementation, and then structurally modified based on the obtained results (17, 18). Assessment requires the employment of an appropriate data collection instrument. Accordingly, suitable tools are needed for assessment and monitoring the nutrition support system since the use of accurate tools helps the policy makers to identify the gaps and barriers. Nutrition support programs have been assessed by various tools in other countries. Questionnaires are the most common tool in nutrition support assessment (14, 19-25). Because of the differences in health systems, developing a native valid questionnaire is the first stage needed for NSI assessment which would cover different aspects of nutrition support services in Iranian hospitals. Although questionnaires were used in other studies, as their validation scores were not mentioned and they did not include all aspects of Iranian NSI, development of a valid questionnaire especially for Iranian hospitals, is required. With this background in mind, the aim of the current study was to develop and validate the questionnaire to evaluate the implementation of the state of nutrition support in Iranian hospitals.

2. Material and Methods

We used a mixed method (quantitative – qualitative) approach to design and validate a questionnaire (26), in order to assess the implementation of nutrition support in Iranian training hospitals in 2016. Development of the questionnaire consisted of both quantitative and qualitative steps and in the validation step, the quantitative approach was used. The process of the design and validation of the questionnaire is shown in Figure 1.

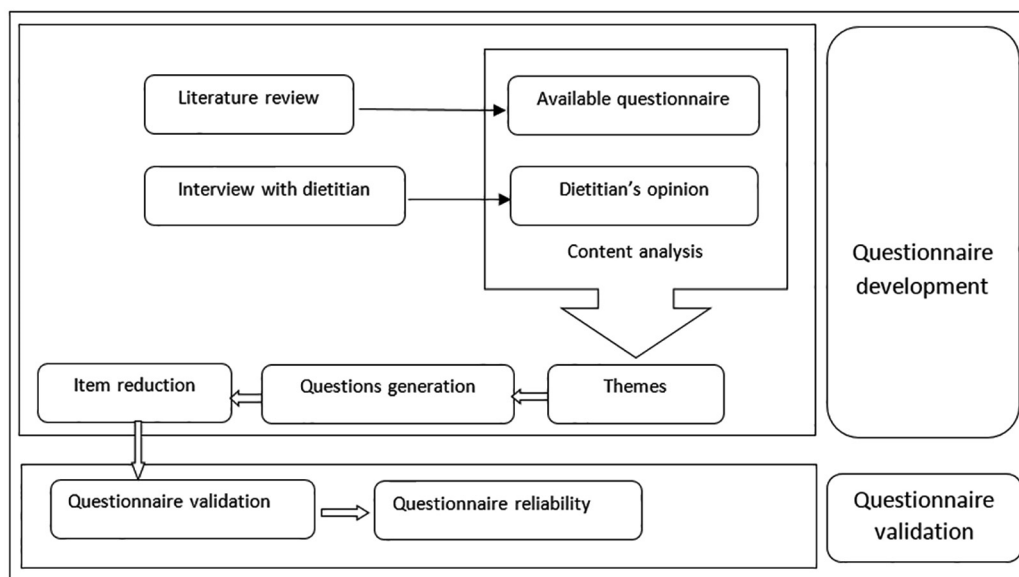


Figure 1. Study protocol

2.1. Questionnaire development

In the quantitative step of questionnaire development, a systematic literature search was performed in English. For this aim, the pre-determined keywords about nutrition support and assessment were searched for on international electronic databases (Web of Science, PubMed, Scopus) with no time limitation. The inclusion criteria was the assessment of the hospital nutrition support state in study scope. The exclusion criteria were: 1) Articles that assessed the effect of nutrition support on patient outcomes, and 2) studies without original full text. All the articles that met the selection criteria entered the data extraction step. In data extraction step, all items of the questionnaires or interviews of the selected articles were analyzed using thematic analysis. The systematic review process was appraised with a CASP systematic review checklist. In the qualitative step, semi-structural interviews were performed based on purposive sampling. Interviews continued till data saturation. Thirteen key informants consisting of four hospital dietitians, two hospital administrators, a staff manager, two nurses, four general

physicians and one nutritionist participated in interviews, who were experts, and familiar with NSI implementation in Iranian hospitals (15). The interviews were recorded with participants' permission. After accurate transcription, the text of interviews were back warded for confirmation. Then the thematic analysis method was used to analyze the interviews. All the items elicited from both literature and interviews were categorized into sub-themes, which were then merged into themes (27). Each theme was selected as a core and as much as possible, questions were designed around each theme based on Iranian NSI. All questions were accurately examined in the item reduction process by a panel of five experts (three nutritionist, a skilled dietitian and a manager in nutrition ward in ministry of health). After discussing each question, some of them were modified or deleted, and the first draft of the questionnaire was developed.

2.2. Questionnaire validation

In order to assess whether the questionnaire completely covered the domains (28), the content validity ratio (CVR) and the content validity index (CVI) were computed after receiving the opinions of the 13 experts about the questionnaire. CVR and CVI are representative of the experts' opinions about the item clarity and rate of necessity of each question, respectively (29). Additionally, the experts were asked to inform the researchers about their comments. Consequently, the questionnaire was modified based on the CVR, CVI, and comments, and the second draft was developed. In the final stage, the pilot study was done in fifty four training hospitals to prove the accuracy or precision of the questionnaire. The samples were selected by the convenient sampling method. The internal consistency of the tool was measured using Cronbach's alpha coefficient for each item and the total questionnaire. The SPSS Ver16.0 was used for statistical analysis.

2.3. Ethics

This study was approved by the Ethics Committee of Mashhad University of Medical Sciences, and the ethical code is MUMS.FM.REC.1395.8.

3. Results

3.1. Questionnaire development

After conducting a comprehensive literature review, 6 articles were included in the study (Figure 2). The main themes were extracted from each study. After merging the themes with the same content, 12 themes were adopted from the literature analysis.

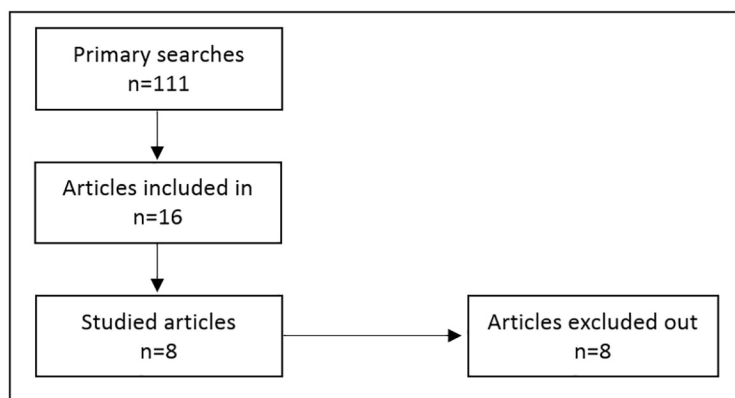


Figure 2. Study selection flowchart in systematic review step

These themes were nutrition support team (NST) characteristics, hospital characteristics, nutrition support management, NST structures, NST tasks, personnel's knowledge, work load, nutrition protocols, nutrition support implementation, nutritional outcomes, nutritional products, and resource allocation (Table 1). After transcription of interviews, the thematic analysis of interviews were performed. In this step, ten themes were extracted, of which four contained the nutrition forms' effectiveness, dietitians' salary and benefits, facilities and equipment and nutrition culture. One of the nurses explains nutrition culture in the hospitals and the impact on the nutrition support implementation. "In fact, I know nutrition is important in patient care and cure, but nutrition is not our priority for care, it is not in-hospital culture, so I don't fill the nutrition screening form for patients." (Participant 13). A dietitian's opinion about their salary is shown below: "If I visit 30 patients a day, I earn nothing. So, what is the difference between my colleague who sits in his room and me?" (Participant 1). The Other themes that were

emphasized in the interviews were the forms' effectiveness. One of the dietitians said: "The forms are boring and lengthy. There are some useless items, and filling them is time consuming" (Participant 5). Facilities and equipment is another theme elicited from interviews. One of the participants explained: "Is there any scale in intensive care units for weighting patients? Although patients must weigh at admission for nutrition screening." (Participant 9). Finally, 16 themes were adopted from thematic analysis of literature review and interviews. These themes were considered as the core for question generation and 110 questions were generated around them, based on the Iranian NSI. After discussing the questions, 65 questions were selected for the first draft in the expert panel.

Table 1. Studied articles and the elicited themes of the questionnaire

Ref. no.	Country	Year	Themes
17	United State	1985	Hospital characteristics
			NST characteristics
			NST member
			Nutrition support functioning
			Availability of NST services
			NST fees
			Attitudes toward the NST
			Involvement in outpatients clinics
30	United State	1992	Hospital characteristics
			NST member
			Availability of NST services
			NST consultants
			Nutrition support functioning
			Home nutrition support
24	Germany	2002	Standards for creating nutritional programs and working hours of the team members
			Other healthcare professionals involvement
			The qualification of the team members and funding support
			Quality control in providing nutritional support and outcome measures
			tasks considered to be within the responsibility of NST member
23	Portugal	2004	NST composition
			NST activities
			Nutritional management
25	Germany, Austria and Switzerland	2005	Structure and work of the team and its financing
			Qualification of team members
			Quality control in providing nutritional support and outcome measures
19	United State	2010	prevalence of NST
			NST characteristics
			NST members
			NST function and productivity
			Effectiveness of NST
			Inpatient Monitoring
			Home Nutrition Support
32	Australia	2010	NST demographics
			NST protocols
33	Korea	2013	NST characteristics of the hospitals
			Perception and knowledge on Nutrition care
			Nutrition care implementation

NST: Nutrition Support Team

3.2. Questionnaire validation

Subsequently, the CVR and CVI were computed for each question. The questions with $CVI < 0.79$ and $CVR < 0.54$ (depending on the number of participants), which respectively represented the lack of clarity and necessity, were omitted; as a result, 55 questions were included in the questionnaire. Following the pilot study, the internal consistency of the questionnaire was measured, which rendered a Cronbach's alpha coefficient of 0.80. This value remained stable for each item, even after an item was deleted, so none of the questions were deleted.

4. Discussion

For nutrition support assessment, a validated questionnaire was required which covered all aspects of it. It should be mentioned that other studies did not report their questionnaire development and validation method (17, 19, 23-25, 30-32), so, we cannot discuss our method details with them. In the present study, the questionnaire was developed in a methodological approach process and validated with high validation and reliability scores which can be a guarantee for the proper tool. Because the development step in our study was based on systematic literature review, all themes in other studies were included. Developing questions based on all 12 themes elicited from reviews, means that the questionnaire covered all items which are problems or important subjects of nutrition support around the world, although the questions could be in different sentences. Some themes such as nutrition support members were indicated in most of the questionnaires (17, 19, 23-25, 30-32), which are important subjects in all nutrition support systems due to the impact on nutrition support outcomes (14). Other themes such as knowledge were indicated in some of the questionnaires due to the specific purpose of the study (32). Some of the extracted themes in our systematic review step were identified in qualitative studies as important subjects in nutrition support. In Jones' study, "resource constraints", "workload", "guidelines" and "lack of awareness" themes were identified as barriers to the implementation of the Canadian nutrition support clinical practice guidelines (33). As in our quantitative results, other studies focusing on obtaining a deep understanding of nutrition care proposed that barriers for NSI implementation are factors such as unclear professional responsibility, difficult communication, and general lack of awareness (22). The use of a qualitative method and interviews with key informants helped us to gain a comprehensive view and focus on some aspects of nutrition support that might have been neglected in other questionnaires. Use of a mixed method also, is helpful for perception of what occurs in reality. Some of the themes extracted from interviews such as "nutrition culture" and "workforce payment" were indicated in other studies. In the Keller study that investigated the perspectives of the nutrition care workforce, it is demonstrated that the development of a nutrition culture is the core of perspectives of nutrition care workforces (34). Martin showed that "coordination between personnel" and "lack of funding" for dietitians were two items which were identified as barriers for nutrition support implementation in hospitals, which is similar to our qualitative results (22). "Forms" and "facilities" themes added to other themes in the qualitative process, means that these issues are essential for NSI implementation in Iran because of characteristics such as hospital structure and resources, and also show Iranian NSI emphasis on preparation of nutrition support foundation which might have been provided in other countries in the past. As the results showed, at the first step, 110 questions were generated based on 16 themes, then the questions were reduced to 65 questions. The 45 questions which are omitted according to the experts' opinion, were identified as less important questions or duplicate concepts of others. In the questionnaire validation stage, ten questions were identified as not having appropriate clarity or necessity. It should be mentioned that the last drafts of the questionnaire with 55 questions, covered all 16 themes although, some of their related questions were omitted in the development and validation processes. Because of the questionnaire comprehensiveness, this validated tool could be used in all systems with a regional modification and help to compare, modify, and consequently improve the efficiency of nutrition support in hospitals, although, the nutrition support services are delivered differently in various health systems based on the different instructions, financing, needs, and organizational culture. The assessment of clinical care is one of the most important parts of implementation, so this methodological approach process for developing a valid tool for assessment of the state of nutrition support could be used for all aspects of clinical care in hospitals. If the process of questionnaire development were performed with more interviews or focus groups of different stakeholders, the questionnaire would be more comprehensive but this was our study limitation. The questionnaire could be validated for other nutrition support systems in other countries to cover the regional circumstances.

5. Conclusions

As a conclusion, a validated questionnaire was developed in a methodological approach. With this questionnaire, the nutrition support in Iranian hospitals could be assessed, which is one of the most important stages for malnutrition management. The utility of the questionnaire would be investigated with a questionnaire-based survey which is now

ongoing by the authors. In future study, this questionnaire could be validated as a unique nutrition support assessment tool for use around the world.

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Conflict of Interest:

There is no conflict of interest to be declared.

Authors' contributions:

All authors contributed to this project and article equally. All authors read and approved the final manuscript.

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