

# Clinical Nutrition Knowledge of Gastroenterology Fellows: Is There Anything Omitted?

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**Abstract-** Despite the increased emphasis on chronic non-communicable diseases, there are notable deficits about nutrition education in many medicine training programs particularly gastroenterology fellowship programs. In the present cross-sectional study, we examined the nutritional knowledge related to clinical nutrition among Iranian gastroenterology fellows. Thirty-six gastroenterology fellows currently enrolled in a gastroenterology fellowship program completed a questionnaire, including two sections. The first of which assessed the gastroenterology fellows experience about nutrition training, nutrition management of patients with gastrointestinal (GI) disorders and evaluating perceived nutrition education needs. The second section consisted of multiple choice questions that assessed nutritional knowledge. A total of 32 gastroenterology fellows completed the first section. The majority of gastroenterology fellows failed to partake in any nutrition education during their fellowship training particularly for inpatients despite the availability to participate in the nutrition training especially for the purpose of nutrition support. Mean correct response rates for the second section was 38%. The highest mean score was seen in nutrition assessment (48.1%), followed by scores of 40.5% in nutrition support, 37.0% nutrition in GI disease, and 25.0% in micro and macronutrients. Iranian gastroenterology fellows have serious deficits in their nutrition knowledge. This study paves the way for the development of an education program to improve nutritional knowledge of gastroenterology fellows.

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## Introduction

Epidemiological studies show the importance of nutrition as a contributing factor to both causing and curing chronic non-communicable diseases (1). As a result, nutrition education has become a requisite part of the nutrition curriculum for medical students (2,3). A background in nutrition is imperative for physicians in a variety of specialties (4). Some medical schools have planned the inclusion of specific nutrition courses in their curriculum (5-8). However, nutrition has been unattended in medical education and treatment procedure (9,10). A recent study showed that a large group of residents have little to no nutrition training

during their postgraduate education (11). Several studies in United States, Canada, Europe and Asia showed that physicians were unsuccessful in treating nutrition problems in their patients because of minimal nutrition knowledge (12-17). A lack of an integrated curriculum, a lack of nutrition physician instructors, and a lack of adequate training of physicians about nutrition have resulted in this critical issue (18). As Ahmadi *et al.* recently demonstrated, Iranian physicians do not have sufficient knowledge about crucial subjects in nutrition such as diet therapy (15). Alimohammadi-Kamalabadi *et al.* evaluated the nutrition knowledge of residents' and interns' in Iran (19). This study showed that most students had minimal nutrition education (19). Hence,

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## Nutrition knowledge of gastroenterology fellows

the nutrition curriculum should be revised for training medical students in Iran. Meanwhile, it must be framed according to the educational needs assessment of Iran society together with internationally successful guidelines, such as the Nutrition Academic Award (20).

It is also important to determine the level of nutritional knowledge of gastroenterologists and improve it. Nutritional abnormalities associated with malabsorption, the provision of nutrition support the gastrointestinal (GI) patient's ambiguity about diet and the high prevalence of obesity among GI patients are reasons for gastroenterologists to take nutritional training courses (21). However, nutrition training in gastroenterology is not standardized in most countries. In a recent study, Raman *et al* showed that the nutritional knowledge of Canada gastroenterology fellows is suboptimal (21). A similar study was carried out by Scolapio *et al.* which indicated a significant deficiency in nutrition training in gastroenterology fellowship programs (22).

According to the literature review, nutrition education should be an indispensable part of gastrointestinal training programs (21-23). Therefore, the goal of the present study was to determine the nutritional experience and knowledge together with a nutrition educational need assessment of gastroenterology fellows. Students' knowledge level was assessed in four fields, including nutrition assessment, macronutrient and micronutrient requirements, nutrition support and nutrition as relevant to GI diseases.

## Materials and Methods

The survey method used was a census-sample process, in that all known Iranian gastroenterology fellows were surveyed in cross sectional study. Thirty six fellows of both sexes participated from six medical university centers: Tehran University of Medical Sciences (n=8), Shahid Beheshti University of Medical Sciences (n=8), Isfahan University of Medical Sciences (n=6), Mashhad University of Medical Sciences (n=6), Shiraz University of Medical Sciences (n=4), and Tabriz University of Medical Sciences (n=4).

### The questionnaire

The questionnaire was composed of two sections, the first of which contained ten-item multiple choice questions to assess the gastroenterology fellow experiences about nutrition training (n=4), nutrition management of patients with GI disorders during GI fellowship (n=4) and evaluating perceived nutrition

education needs (n=2). The second section of the questionnaire contained multiple-choice questions to evaluate nutritional knowledge of GI fellowships. This section was comprised of twenty-item multiple choice questions which were constructed to reflect all four domains of nutrition education relevant to a general gastroenterologist, including nutrition assessment (n=3), nutrition support (n=10), micronutrients and macronutrients (n=4) and nutrition as relevant to GI diseases (n=3). The questionnaire of Raman *et al.* was modified and translated in Persian (21). The number of the questions for each domain was determined according to the weighting scheme of Raman *et al.* (21). Content validity of the questionnaire was assessed by nutritionists and gastroenterologists with expertise in medical nutrition therapy of GI disorders. In addition, face validity was assessed by a group of newly qualified gastroenterologists. An answer key, which was carefully reviewed by the content validity group, was developed. Fellows were asked to choose the single best answer for each question. The questionnaires were filled out in the presence of a member of the research team and the time required was approximately thirty minutes.

### Statistical analysis

All statistical analyses were performed using the SPSS statistical software package version 17.0 (SPSS Inc., Chicago, IL, USA) and  $P < 0.05$  was considered significant. Results were expressed as mean  $\pm$  SD or percentage. Student's t-tests and analysis of variance (ANOVA) were used to test differences between first and second year GI fellows. Scores percent for each of the domains were compared using a one-way ANOVA with multiple post-hoc group comparisons using Tukey honestly significant difference (HSD) tests. Reliability was determined using Cronbach's alpha. Multiple linear regression analysis was performed to determine significant predictors of test performance.

## Results

Of the total study cohort (n=36), 66.6% were males and 33.4% were females. The mean age of the men and women was 36.7 (SD 2.5) and 37.9 (SD 2.2) years, respectively. Fifty-six percent of participants (n=20) were in the first year of their fellowship and the remainder (n=16) were in their second year. Twenty eight (61.1%) fellows had not received any formal nutrition education during their fellowship to date. This was clearly recognized as a deficiency as all of the fellows expressed an interest in participating in regular

nutrition training and agreed that nutrition support is necessary for inclusion in the GI fellowship program.

A total of 32 (89%) gastroenterology fellows completed the first and second sections of the questionnaire. Four participants did not read and complete either section of the questionnaire declaring that they had insufficient nutrition knowledge to answer the questions. The first section indicated good satisfactory internal consistency and reliability with a Cronbach's alpha value of 0.74. Table 1 shows the first section of the questionnaire and the answers of the gastroenterology fellows. The average correct score on the knowledge questionnaire was  $7.6 \pm 3.9$  (38%). Mean

knowledge score percents for individual topics are provided in table 2. There were no significant differences in knowledge scores between first and second year gastroenterology fellows. Hence, the data were analyzed for both groups collectively. Fellows had the highest score percent in the nutrition assessment, which was higher than all other domains ( $P=0.85$ ). Nutrition support score percent was higher than nutrition as relevant to GI diseases ( $P=0.98$ ) and macronutrients/micronutrients score percent ( $P=0.35$ ). The lowest score percents were in the area of macronutrients/micronutrients, followed by nutrition as relevant to GI diseases.

**Table 1.** The first section of the questionnaire and the answers of gastroenterology fellows.

Questions	Answers (%) (n = 32)			
	Yes	No		
Nutrition training				
1. Have you ever had any nutrition training in hospitalized patients?	40.6	59.4		
2. Have you known there is a chapter about nutrition in Harrison text book?	56.2	43.8		
3. Have you ever participated in any nutritional workshop?	31.2	68.8		
4. Do you have enough information about the enteral and parenteral nutrition solutions available in our markets?	12.5	87.5		
	Times			
Nutrition management of patients with GI disorders	0-10	11-50	> 51	
5. How many times have you ever consulted with a nutritionist for your patients?	40.6	46.9	12.5	
6. How many times have you ever done enteral and/or parenteral nutrition support?	68.7	25.1	6.2	
7. How many times have you inserted PEG and/or PEJ?	34.4	53.1	12.5	
8. How many times have you inserted NG tube?	6.2	28.1	65.7	
perceived nutrition education needs	GI diseases	nutrition assessment	nutrition support	macronutrient and micronutrient requirements
9. Which field of nutrition is more necessary for including in GI fellowship course? (you can choose more than one)	87.5	78.1	100	71.9
10. In which fields of nutrition, would you like to participate? (you can choose more than one)	90.6	84.4	93.7	75.0

**Table 2.** Mean knowledge scores for each topic.

Nutrition Knowledge Topic	Total score	Mean % Correct (n = 32)		P-value
		First year GI fellows	Second year GI fellows	
Nutrition Assessment (3 items)	48.1	53.3	41.7	0.52
Nutrition Support (10 items)	40.5	41.0	40.0	0.94
Macronutrient and Micronutrient Requirements (4 items)	25	20.0	31.2	0.40
Nutrition as Relevant to GI Diseases (3 items)	37.0	43.3	29.2	0.13
All topics (20 items)	38.0	39.0	36.9	0.83

## Discussion

The present study provides an insight into the nutritional knowledge of Iranian gastroenterology fellows. Consistent with prior studies (21,22), gastroenterology fellows answered less than two-third of the knowledge questions correctly. There were notable deficits in knowledge of macronutrients/micronutrients and nutrition as relevant to GI diseases. Mean correct response rates in the present study was 39.0% which was substantially lower than the mean correct response rates reported by Raman *et al.* and Scolapio *et al.* at 50% and 58% respectively (21,22). In the present study, the lowest score percents were in the area of macronutrients/micronutrients which was similar to that reported by Raman *et al.* Singh *et al.* showed a lack of nutrition knowledge in the domain of nutrition support among practicing Canadian gastroenterologists (23).

Most gastroenterology fellows did not take part in any nutrition education during their fellowship program particularly for inpatients and all were applicants to participate in the nutrition training especially for the purpose of nutrition support. Singh *et al.* showed reported that 73% of Canadian gastroenterologists felt that their gastroenterology training in nutrition was inadequate (23).

There is a general lack of GI fellow knowledge about enteral and parenteral nutrition solutions available in our markets. Moreover, the GI Fellows' experience around nutritional management of patients with GI disorders including enteral and/or parenteral nutrition support is lacking. Conversely 53% of GI fellows have inserted a percutaneous endoscopic gastrostomy/jejunostomy (PEG and/or PEJ) tube 11-50 times and 12.5% more than 51 times. On the other hand most of the trainees had inserted an nasogastric (NG) tube.

Gastroenterologists are actively involved in the assessment and provision of nutritional support to patients at nutritional risk and patient with under nutrition or malnutrition. It is also the role of the gastroenterologist to determine whether caloric support can be provided oral, enterally (via gastrostomy, gastrojejunostomy or jejunostomy tube) or when enteral nutrition support is not possible via the parenteral route (23). Ideally these decisions are made in conjunction with a multidisciplinary team involved in the nutritional care of the patient.

Although the specialty of gastroenterology began in the world more than 100 years ago, this discipline was established in Iran about 40 years later by French graduates in Iran; Gastroenterology and hepatology

emerged in 1976 as a subspecialty training program at Tehran University and later in 1984 at Shahid Beheshti, and Shiraz Universities. The Iranian Association of Gastroenterology and Hepatology (IAGH), was founded by the first Iranian graduates in gastroenterology in 1991 (24). Significant advances have been achieved in gastroenterology and hepatology in the last two decades, but a nutritional course during GI fellowship program has not yet been established. However, we need a well-designed strategic plan to provide nutritional knowledge the gastroenterologists in Iran (24). Therefore, we suggest that gastroenterology fellows' knowledge and counseling skills can be enhanced by a shift in the timing of nutrition education, with an emphasis on nutrition assessment, macronutrient and micronutrient requirements, nutrition support and nutrition as relevant to GI diseases throughout the fellowship training. In an effort to standardize nutrition education for gastroenterology fellowship programs, IAGH should create the gastroenterology fellowship curriculum in Clinical Nutrition and each university who train gastroenterology fellows should employ a full time faculty member with expertise in nutrition management of patients with GI disorders.

The strength of the present study is that it is the first attempt at assessment of the nutritional knowledge of Iranian gastroenterology fellows by the validated questionnaire. Furthermore, all known Iranian gastroenterology fellows from six different universities in five provinces were surveyed by using a validated questionnaire.

In conclusion, Iranian gastroenterology fellows have serious deficits in their nutrition knowledge. This study paves the way for further discussions to identify strategies to improve nutrition training and to improve nutrition education for Iranian gastroenterology fellows.

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