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## Original article

# Greek translation and cultural adaptation of the scored patient-generated subjective global assessment: A nutritional assessment tool suitable for cancer patients



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## SUMMARY

**Background and aims:** Patients with cancer frequently present with disease-related malnutrition and functional decline. The scored Patient-Generated Subjective Global Assessment (PG-SGA®) is a malnutrition screening and assessment tool commonly used in patients with cancer. The aim of the current study was to translate and culturally adapt the original English PG-SGA for the Greek setting, including assessment of comprehensibility, difficulty and content validity in patients and healthcare professionals. **Methods:** Our study was conducted according to the ten steps of the International Society for Pharmacoeconomics and Outcomes Research (ISPOR) Principles of Good Practice for Translation and Cultural Adaptation. Comprehensibility and difficulty of the Greek translation were assessed in 100 patients and 100 healthcare professionals (HCPs) from Greece. Content validity of the translation was assessed among HCPs. Item and scale indices were calculated for comprehensibility (I-CI; S-CI), difficulty (I-DI; S-DI), and content validity (I-CVI; S-CVI).

**Results:** Patient perceived comprehensibility and difficulty of the PG-SGA were considered to be excellent (S-CI = 0.97, S-DI = 0.97). HCPs perceived content validity for the patient component was also excellent (S-CVI = 0.95). The perceived content validity, comprehensibility and difficulty for the professional component of the PG-SGA, as perceived by the HCPs, was excellent (S-CVI = 0.94, S-CI = 0.94, S-DI = 0.90), with the physical exam being perceived as most difficult (I-DI = 0.78–0.92).

**Conclusions:** Our study resulted in the successful translation and cross-cultural adaptation of the original English PG-SGA for the Greek setting. The Greek language version of the PG-SGA is characterized by high comprehensibility, low difficulty, and is considered relevant for use in Greece.

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## 1. Introduction

Disease-related malnutrition is commonly observed in patients with cancer and is considered a major consequence of therapeutic regimens and disease progression [1]. According to a large Italian study (n = 1952), malnutrition occurred in 40%–80% of patients with cancer, while the majority of these patients were

malnourished even at the time of diagnosis [2]. A study (n = 108) in Greece indicated that 47.2% of esophagogastric cancer patients were severely malnourished preoperatively [3]. Moreover, a large study (n = 564) in the United States reported that 39.3% of patients with head and neck cancer exhibited unintentional weight loss of more than 10% at 9-month follow-up after cancer diagnosis [4]. Some types of cancer are associated with higher malnutrition

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prevalence rates, such as gastroesophageal [3], head and neck [4], and pancreatic cancers [5], due to tumor location that affects adequate nutritional intake and absorption. Poor nutritional status of patients with cancer is strongly related to impaired quality of life [6], increased risk for postoperative complications [7], early discontinuation of adjuvant therapies [8], and shorter survival [9].

Early identification of malnourished patients and patients at risk of malnutrition is of utmost importance in optimizing outcomes. Timely nutritional interventions can exert positive effects on patients' nutritional status by assisting patients to cope with the symptoms of the disease and therapy side effects associated with malnutrition risk [10].

Several nutritional assessment methods have been proposed and implemented in the clinical setting in order to evaluate patients' nutritional status. Nevertheless, every tool is accompanied with specific strengths and limitations. According to the European Society for Clinical Nutrition and Metabolism (ESPEN) recommendations, patients with abnormal nutritional screening should undergo more detailed nutritional assessment. Nutritional reassessment should be performed at frequent intervals to help ensure progressive optimization of nutritional status [11].

The Scored Patient-Generated Subjective Global Assessment (PG-SGA; Copyright FD Ottery) is a multidimensional malnutrition screening, assessment, monitoring and triaging tool. The PG-SGA includes a patient component [12], to evaluate weight history, food intake, nutrition impact symptoms, and activities and function. The professional component evaluates presence of catabolic conditions increasing nutritional requirements; metabolic demand; and physical examination to evaluate nutrition deficit or loss. The PG-SGA generates two results: a global assessment category (PG-SGA Stage A: well nourished, PG-SGA Stage B: moderate/suspected malnutrition, or PG-SGA Stage C: severely malnourished); and a numerical point score facilitating triage for interventional recommendations. The PG-SGA was developed and validated as a modification of the Subjective Global Assessment (SGA) and has been extensively used internationally in patients with cancer and other patient populations since its introduction in the late 1990s [12,13].

No Greek language version of the PG-SGA developed according to International Society for Pharmacoeconomics and Outcomes Research (ISPOR) Principles of Good Practice for Translation and Cultural Adaptation ISPOR-based principles has been available for screening and assessment of cancer patients. The aim of the current study was conducted according to the ISPOR-based process to assess comprehensibility, difficulty, and content validity of the PG-SGA translated and culturally adapted for patients and healthcare professionals (HCPs) in the Greek language setting.

## 2. Methods

The process of translation, cultural adaptation, and evaluation was conducted between September 2018 and May 2020, after permission was given from the key developer and copyright holder of the PG-SGA (FDO) to translate the original English PG-SGA into Greek. All translation steps and the final Greek version of the PG-SGA have been supervised and approved by the creator of the PG-SGA (FDO) and the international expert on translation and cultural adaptation of the PG-SGA (HJW). Written informed consent was obtained from all patients prior to the start of the study. The study protocol was approved by the Human Research Ethics Committee of Laikon General Hospital, Athens, Greece (reference number: 1220).

The translation and cultural adaptation process was performed according to the ten steps of the ISPOR process for the translation and cultural adaptation process for patient-reported outcome

measures [14], in order to safeguard conceptual, semantic and operational equivalence. The procedure was also based on the Dutch translation and cultural adaptation protocol [15], in an effort to ensure consistency and comparability of our results among international translations and cultural adaptations of the PG-SGA. The ten steps followed in our study are reported in detail in the Dutch study [15] and are summarized as follows: (1) Preparation, (2) Forward translation, (3) Reconciliation, (4) Back translation, (5) Back translation review, (6) Harmonization, (7) Cognitive debriefing and content validity assessment, (8) Review of cognitive debriefing results and finalization, (9) Proofreading, and (10) Final report.

One hundred consecutive patients admitted to the First Department of Surgery, Laikon General Hospital in Athens, Greece were recruited by two clinical researchers. Patients speaking Greek as native language aged  $\geq 18$  years old, diagnosed with cancer, willing to provide all the required information, and with no significant cognitive impairment were included. The assessment of patients' cognitive functioning was based on the Mini-Mental State Examination (MMSE). None of the patients had impaired cognitive function according to the cutoff proposed by Dick et al. (i.e.  $<24$ ) [16]. Patients were instructed to rate comprehensibility and difficulty of the Boxes 1–4 of the PG-SGA. These 4 boxes were designed to reflect approximately 80%–90% of the score for any given patient and are officially known as the PG-SGA Short Form (PG-SGA-SF). The questionnaire for this study consisted of 36 four-point Likert scales regarding comprehensibility and six regarding perceived difficulty, while at the end of the questionnaire, patients were asked to answer open ended questions concerning the feedback on the Greek wordings, as well as demographic data including sex, age, medical diagnosis, cancer stage (American Joint Committee on Cancer Staging Manual, 8th edition) level of education, and current profession.

The composition of the HCPs sample was multidisciplinary, including dietitians/nutritionists, dietetics students, nurses, physicians, medical students, physiotherapists and pharmacists, so that the sample would be representative for the spectrum of professionals that will be using the PG-SGA in daily practice. First, in our study three university hospitals were chosen to take part in our study. These specific hospitals were chosen because in these hospitals, all targeted healthcare disciplines were employed. The Human Resources (HR) departments of these university hospitals contacted all targeted HCPs that were subscribed in their mailing lists via e-mail.

In total, 200 HCPs were contacted:  $n = 57$ ,  $n = 72$ , and  $n = 71$  for the three hospitals, respectively. The initial e-mail included a study invitation, as well as some questions regarding the healthcare professional's experience in, familiarity with, and/or training in the PG-SGA. Out of these 200, 141 HCPs agreed to participate in our study. Twenty-six HCPs were experienced in, familiar with, and/or trained in the PG-SGA and were excluded from the study.

The first 100 professionals who were interested in participating responded to and were not experienced in, familiar with, and/or trained in the PG-SGA were further invited to complete a questionnaire concerning comprehensibility, difficulty and relevance of the components of the PG-SGA. The participants shared their answers verbally or via e-mail (Fig. 1).

The HCPs included in our study worked mainly in clinical settings or in academia. Healthcare professionals were asked to complete a questionnaire that consisted of 38 four-point Likert scales regarding comprehensibility, 35 regarding difficulty of the professional component of the PG-SGA (i.e., the Worksheets), and 75 four-point Likert scales for the perceived relevance of both the patient- and professional-generated components of the PG-SGA (Fig. 1). In addition, HCPs answered additional open ended

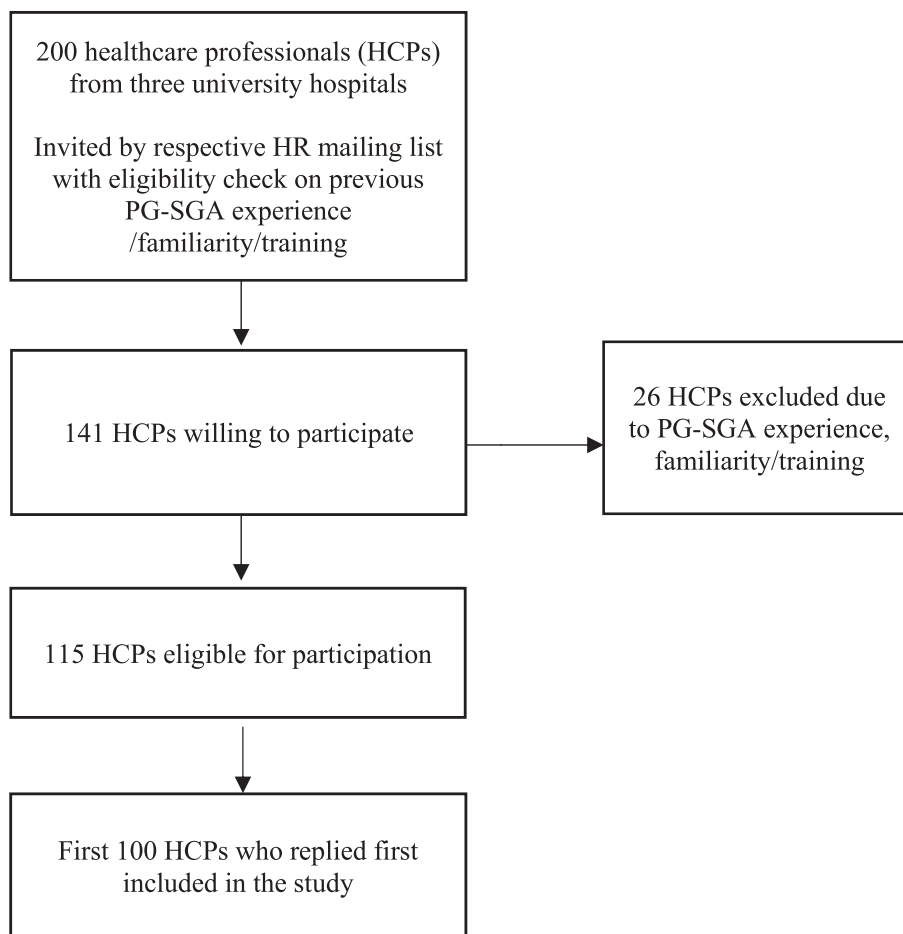


Fig. 1. Flow-chart of participants selection.

questions regarding suggestions for potential changes in the Greek wordings of the professional component of the PG-SGA, and questions on their demographics (i.e., current and former profession, years of working experience in current profession, work setting, patient population(s) working with).

### 2.1. Statistical analysis

The calculation of all item indices was as follows: a 4-point scale (1 = very irrelevant/very unclear/very difficult, 2 = irrelevant/unclear/difficult, 3 = relevant/clear/easy, 4 = very relevant/very clear/very easy) was implemented, in order to classify derived scores as “not present” (Scores 1 and 2 were recoded to 0) or “present” (Scores 3 and 4 were recoded to 1). Item indices are proportional scores ranging from 0 to 1, calculated by dividing the number of respondents who considered the item to be “present” by the total number of respondents. Indices were calculated for each item for perceived comprehensibility (I–CI), difficulty (I–DI), and content validity (I–CVI). The scale index of each construct was calculated by averaging all the item indices for the relevant construct (S–CI, S–DI, and S–CVI). The S–CVI was calculated by averaging the I–CVI scores for the full PG-SGA. The S–CVI of the full PG-SGA is indicative of the overall relevance of the instrument to the concept of malnutrition as perceived by the HCPs. Higher S–CVI values indicate a stronger consensus on the validity of the instrument [15]. The S–CI and S–DI of the patient-generated component of the PG-SGA were calculated by averaging I–CI scores and I–DI scores of boxes 1 to 4. The S–CI and S–DI of the professional component of the PG-SGA were

calculated by averaging I–CI scores and I–DI scores of Worksheets 1 to 5.

Item indices above 0.78 are considered excellent, whereas item indices <0.78 require further analysis of the item [17]. Scale indices  $\geq 0.80$ – $0.89$  are considered acceptable and  $\geq 0.90$  as excellent [17,18]. Patients and HCPs’ non-response to items were excluded from the calculation of the index scores. Descriptive statistics were reported as frequency, percentage, and mean  $\pm$  standard deviation (SD). All the calculations were made by using SPSS (SPSS Inc., Chicago, IL) statistical software package version 20.0.

### 3. Results

Following the first six steps of the ISPOR process, a pre-final version of the Greek PG-SGA was created. Subsequently, the translated version was evaluated for comprehensibility, difficulty, and content validity in a sample of 100 cancer patients and 100 HCPs. Documentation and details on each of the steps of the ISPOR procedure are available upon request from the corresponding author. The subsample of HCPs consisted of 34 dietitians, 10 nurses, 41 doctors, 3 physiotherapists, 1 pharmacist, 2 dietetics students, and 9 medical students, as presented in Table 1. The mean years of experience for the non-student participants was  $8.9 \pm 7.9$  years. None of the participants reported previous experience with the PG-SGA. In the patient group, a total of 100 patients with various cancer diagnoses completed the questionnaire. Characteristics of patients are described in Table 2. The item response rate for the professionals and the patients was 100%.

**Table 1**

Characteristics of professionals who completed the questionnaire on content validity, comprehensibility and difficulty (n = 100).

Characteristic	n (%)
Current Profession	
Dietitian	34 (34)
Dietetics Student	2 (2)
Nurse	10 (10)
Doctor	41 (41)
General Surgeons	21 (21)
Medical Oncologist	20 (20)
Medical Student	9 (9)
Physiotherapist	3 (3)
Pharmacist	1 (1)
Years of experience in current profession (non-students, n=89)	8.85 ± 7.90

**Table 2**

Characteristics of the patient group who completed the questionnaire on comprehensibility and difficulty (n = 100).

Characteristic	n (%)
Age (years)	67.69 ± 12.47
Sex	
Male	45 (45)
Female	55 (55)
Type of Cancer	
Esophagogastric	38 (38)
Hepatopancreaticobiliary	36 (36)
Colon cancer	14 (14)
Breast cancer	7 (7)
Other	5 (5)
Stage	
<i>in situ</i>	2 (2)
I	12 (12)
II	26 (26)
III	38 (38)
IV	22 (22)
Education	
University level	57 (57)
Upper secondary school	33 (33)
Primary school or other	10 (10)

In **Table 3**, comprehensibility and difficulty as perceived by patients for the patient component of the Greek language version of the PG-SGA, as well as content validity of the patient component of the Greek language version of the PG-SGA as perceived by the HCPs are presented. Individual item scores and scale indices for all three constructs (i.e., comprehensibility, difficulty and content validity) were considered excellent. More specifically, the S-CVI was 0.95, with individual CVI item scores ranging from 0.82 to 1.00. Accordingly, the S-CI was 0.97, with individual CI item scores varying from 0.79 to 1.00, whereas the S-DI was 0.97, with individual DI item scores varying from 0.91 to 1.00.

The results of the evaluation of the professional component of the Greek language version of the PG-SGA are shown in **Table 4**. All individual item scores and scale indices resulting from the evaluation by professionals were considered excellent. S-CVI was 0.94 with individual CVI item scores ranging from 0.82 to 1.00, while S-CI was 0.94 with individual CI item scores ranging from 0.86 to 1.00. Regarding difficulty, the S-DI was 0.90, with individual item scores ranging from 0.78 to 0.99, with the lowest scores reported on the Worksheet 4-Physical exam.

Taking into account the individual item scores and the comments provided by the patients and the professionals who completed the questionnaire, slight modifications were implemented, resulting in the final version of the Greek PG-SGA. The final version was then finalized (version 20–014 v08.06.20) and published at [www.pt-global.org](http://www.pt-global.org) on 31 August 2020 (**Fig. 2a** Patient

component and **Fig. 2b** Professional component-Supplementary material).

#### 4. Discussion

In this study, the PG-SGA was translated and culturally adapted for the Greek setting according to the ISPOR principles. The data demonstrated excellent comprehensibility and difficulty as perceived by both patients and HCPs. Additionally, the data demonstrated excellent content validity as perceived by HCPs. Moreover, all individual item scores of both the patient component and professional component of the Greek language version of the PG-SGA were considered acceptable to excellent for comprehensibility, difficulty, and content validity by pre-specified criteria.

These results indicate that the patient component and professional component of the Greek language version of the PG-SGA are feasible to be completed by patients and healthcare professionals, respectively. Moreover, the excellent scores on content validity of both the patient and professional component indicate that the Greek PG-SGA is considered relevant for screening and assessment of malnutrition by the Greek healthcare professionals.

Overall, our results are consistent with previous studies in the German [19], Thai [20], Norwegian [21], and Dutch [15] populations that followed the same methodological steps. In the current study, the patient scores on perceived comprehensibility of the patient component of the Greek PG-SGA (S-CI = 0.97) were comparable with those derived from the Dutch [15], German (S-CI = 0.96) [19], Thai (both S-CI = 0.99) [20], and Norwegian populations (S-CI = 0.99) [21]. In addition, our results on perceived difficulty (S-DI = 0.97) were slightly higher compared to the German (S-DI = 0.91), Dutch (S-DI = 0.96), and Thai study (S-DI = 0.95) respectively, whereas in the Norwegian study the reported S-DI was 0.98. We also found similar results regarding the perceived content validity of the patient component (S-CVI = 0.95) compared to the Dutch and Thai study (both S-CVI = 0.95), whereas we found lower scores than the Norwegian study (S-CVI = 0.99) and higher scores than the German study (S-CVI = 0.90).

Furthermore, the evaluation of the professional component of the PG-SGA revealed that all individual components were considered as having acceptable relevance, in contrast to results in the previous studies. Our results indicate that even though the healthcare professionals participating in our study were not experienced with, familiar with and/or trained in the PG-SGA, they perceived the items of the PG-SGA as very relevant in the context of malnutrition. Scores on comprehensibility and difficulty of the professional component by the healthcare professionals in our study were higher than those in the previous studies [15,19–21]. Similar to previous studies, the lowest scores were observed for the physical examination Worksheet 4) [15,19–21]. The evaluation of perceived difficulty of the professional component yielded the lowest scores. These relatively lower scores on perceived difficulty of the physical examination indicate that the lack of experience with the PG-SGA might have prevented professionals from considering the completion of the physical examination as an easy option. Professionals' lack of sufficient knowledge and/or skills to perform the physical exam might be related to perceived difficulty and might also be related to lower levels of perceived comprehensibility and content validity.

A Dutch study in patients with head and neck cancer also demonstrated that self-completion of the patient component of the PG-SGA, i.e., the PG-SGA Short Form, is feasible, although almost half of the patients need help with completion [22]. A recent study in a small group of patients with cancer also highlighted the need of close collaboration between patients and healthcare professionals in order to give instructions to patients on how to complete the

**Table 3**

Indices for comprehensibility, difficulty and content validity for the patient component (PG-SGA-SF) of the Greek Patient-Generated Subjective Global Assessment as perceived by healthcare professionals and cancer patients.

Sample	Patients	Patients	Professionals
Item	I–CI (n = 100)	I-DI (n = 100)	I-CVI (n = 100)
Box 1. Weight			
1a I currently weigh about ___ kg	1.00	0.96	0.97
1b I am about ___ cm tall	1.00	1.00	0.94
1c One month ago, I weighed about ___ kg	1.00		0.98
1d Six months ago I weighed about ___ kg	1.00		0.99
1e Weight—decreased, not changed, increased	1.00		0.97
Box 2. Food intake			
2a. As compared to my normal intake, I would rate my food intake during the past month as	0.96	0.99	0.98
2a1 Unchanged, more than usual, less than usual	1.00	0.91	0.98
2b. I am now taking	1.00		0.93
2b1 Normal food- but less than normal amount	0.98		0.93
2b2 Little solid food	0.94		0.95
2b3 Only liquids	1.00		0.95
2b4 Only nutritional supplements	0.79		0.93
2b5 Very little of anything	0.99		0.87
2b6 Only tube feedings or only nutrition by vein	0.80		0.98
Box 3. Symptoms			
3a. I have had the following problems that have kept me from eating enough during the past 2 weeks	0.99	0.97	0.98
3a1 No problems eating	0.96		0.95
3a2 No appetite. Just did not feel like eating	1.00		0.96
3a3 Nausea	0.93		0.94
3a4 Constipation	0.96		0.95
3a5 Mouth sores	0.84		0.91
3a6 Things taste funny or have no taste	0.97		0.92
3a7 Problems swallowing	0.91		0.95
3a8 Pain, where?	1.00		0.96
3a9 Other	1.00		0.96
3a10 Vomiting	1.00		0.99
3a11 Diarrhea	1.00		0.95
3a12 Dry mouth	0.91		0.82
3a13 Smells bother me	1.00		0.91
3a14 Feel full quickly	1.00		0.91
3a15 Fatigue	0.99		0.93
Box 4. Activities and function			
4a. Over the past month. I would generally rate my activity as	0.98	0.96	0.99
4a1 Normal with no limitations	0.99		0.95
4a2 Not my normal self, but able to be up and about with fairly normal activities	0.97		0.97
4a3 Not feeling up to most things, but in bed or chair less than half the day	0.99		0.97
4a4 Able to do little activity and spend most of the day in bed or chair	0.99		1.00
4a5 Pretty much bedridden, rarely out of bed	1.00		0.98
Scale indices patient-generated component	S–CI 0.97	S-DI 0.97	S-CVI 0.95

I–CI, Item Comprehensibility Index; I-DI, Item Difficulty Index; I-CVI, Item Content Validity Index; S–CI, Scale Comprehensibility Index; S-DI, Scale Difficulty Index; S-CVI, Scale Content Validity Index.

patient component, while professionals should have adequate knowledge of the questionnaire and its use for the assessment of malnutrition [23]. Indeed, in an Australian study in 189 adult in-patients, 16 dietitians who were trained in the use of the PG-SGA showed good inter-rater reliability [24]. Moreover, previous studies in the Netherlands and Portugal demonstrated that one day of theoretical and practical education and training led to improved perceived comprehensibility and less difficulty of healthcare professionals in performing the PG-SGA [25,26].

The results for the Greek translation and cultural adaptation illustrate that the final Greek version of the PG-SGA successfully maintained purpose, meaning, and format of the original Scored PG-SGA and is suitable for use in the clinical setting and in future research conducted in the Greek language. This tool is, to our knowledge, the only validated Greek version of the PG-SGA according to the ISPOR's Guidelines and the standard methodological procedure proposed by Sealy et al. [15]. Moreover, the total number of patients and professionals that participated in our study exceeded the total number of participants recommended by ISPOR, ensuring the accuracy of our results.

Of note, a previous study in patients with cancer in a palliative care unit in Greece provided interesting data regarding the

reliability and validity of a Greek version of the PG-SGA [27]. The researchers concluded that the PG-SGA was a psychometrically sound assessment tool in Greek oncologic patients. Based on the methodology published by the authors, their study was not conducted according to the ISPOR guidelines and did not focus on cultural adaptation of the instrument. Therefore, the official Greek version of the PG-SGA in cooperation with and with oversight by the creator of the PG-SGA is the one created and evaluated in the current study. A simple translation of the PG-SGA may alter its purpose and meaning, because differences exist between languages, and additionally differences may exist between the corresponding cultures.

Differences between the source culture and the target culture may influence the cultural equivalence of an instrument. In order to use a translated research tool most appropriately in a specific population, it is necessary to follow a systematic translation and cultural adaptation process to ensure that the original purpose and intention of the tool is reflected into the new translated version. This process safeguards consistency and reliability of the collected data, as well as consolidation from or comparability of the results among different countries and settings [28].

**Table 4**

Indices for comprehensibility difficulty and content validity for the professional component of the Greek Patient-Generated Subjective Global Assessment as perceived by healthcare professionals.

Sample Item	Professionals	Professionals	Professionals
	I–CI (n = 100)	I–DI (n = 100)	I–CVI (n = 100)
Scoring weight loss	0.98	0.96	0.99
Worksheet 2. Disease and its relation to nutritional requirements	1.00	0.99	0.99
2a. Cancer	0.99	0.98	0.99
2b. AIDS	0.99	0.94	0.99
2c. Pulmonary or cardiac cachexia	0.97	0.83	0.94
2d. Chronic renal insufficiency	0.98	0.97	0.97
2e. Presence of decubitus, open wound or fistula	0.97	0.98	0.82
2f. Presence of trauma	0.98	0.98	0.96
2g. Age greater than 65	0.99	0.96	0.98
2h. All relevant diagnoses	0.98	0.83	0.95
2i. Primary disease staging (circle if known or appropriate) I, II, III, IV, other	0.98	0.85	0.98
Worksheet 3. Metabolic demand	0.99	0.96	0.99
3a. Fever	0.99	0.94	0.99
3b. Fever duration	0.99	0.87	0.98
3c. Corticosteroids	0.98	0.97	0.96
Worksheet 4. Physical exam	0.91	0.85	0.97
4a. Temples (temporalis muscles)	0.90	0.80	0.92
4b. Clavicles	0.90	0.86	0.90
4c. Shoulders (deltoids)	0.90	0.86	0.88
4d. Interosseous muscles	0.89	0.80	0.90
4e. Scapula (latissimus dorsi. Trapezius. deltoids)	0.92	0.84	0.90
4f. Thigh (quadriceps)	0.92	0.87	0.89
4g. Calf (gastrocnemius)	0.93	0.92	0.91
4h. Global muscle status rating	0.94	0.84	0.94
4i. Orbital fat pads	0.90	0.78	0.85
4j. Triceps skin fold	0.90	0.86	0.90
4k. Fat overlying lower ribs	0.86	0.80	0.88
4l. Global fat deficit rating	0.89	0.84	0.94
4m. Ankle edema	0.89	0.92	0.91
4n. Sacral edema	0.91	0.86	0.89
4o. Ascites	0.92	0.92	0.94
4p. Global fluid status rating	0.89	0.87	0.93
Worksheet 5. Global Assessment Categories			
Stage A: well nourished; Stage B: moderate/suspected malnutrition; Stage C: severely malnourished	0.92	0.95	1.00
Nutritional triage recommendations: Additive score	0.88	0.90	0.99
Triage: 0–1, no intervention required at this time. Re-assessment on routine and regular basis during treatment	0.89	0.92	0.97
Triage: 2–3, patient and family education by dietitian, nurse, or other clinician with pharmacologic intervention as indicated by symptom survey (Box 3) and lab values as appropriate	0.91	0.91	0.96
Triage: 4–8, requires intervention by dietitian. in conjunction with nurse or physician as indicated by symptoms (Box 3)	0.92	0.92	1.00
Triage: ≥ 9, indicates a critical need for improved symptom management and/or nutrient intervention options	0.91	0.91	1.00
Scale indices professional component	S–CI 0.94	S–DI 0.90	S–CVI 0.94

I–CI, Item Comprehensibility Index; I–DI, Item Difficulty Index; I–CVI, Item Content Validity Index; S–CI, Scale Comprehensibility Index; S–DI, Scale Difficulty Index; S–CVI, Scale Content Validity Index.

The current study has limitations that need to be addressed. Firstly, our study sample consisted of patients with cancer only and applicability in other patient populations needs to be confirmed by future studies. In addition, during the translation and cultural adaptation process, we could not recruit patients and professionals as couples (i.e., to include professionals that have performed the PG-SGA in one patient, prior to completing the questionnaires), which did not allow simulating a situation of daily practice. Moreover, the results could have been influenced by the educational level of participants. Given that in our study, 57% of patients had high educational level, defined as postsecondary education, an overestimation of the patients' results due to a higher-than-average education level cannot be excluded. In addition, in our study all patients had sufficient cognitive functioning. Therefore, the results may not necessarily be generalizable to patients with low education or lower MMSE scores. Cancer stage of patients is another factor that could have affected our results. Patients with advanced cancer stages could have an impaired ability to comprehend and rate the components of the PG-SGA.

In conclusion, this study resulted in the successful translation and cross-cultural adaptation of the original English PG-SGA for the Greek setting according to ISPOR principles. The Greek language version of the PG-SGA is characterized by high comprehensibility and low difficulty by patients and professionals, and is considered relevant for use by Greek speaking patients globally – with potential for improvement in quality of care where patients are not fluent in the language of the country in which they are residing.

### Consent to participate

Informed consent was obtained from all individual participants included in the study.

### Funding

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## Ethics approval

The study protocol was approved by the Human Research Ethics Committee of Laikon General Hospital, Athens, Greece (reference number: 1220).

## Availability of data and material (data transparency)

Available upon request.

## Code availability (software application or custom code)

N/A.

## Author contributions

Conceptualization: Harriët Jager-Wittenaar RD, PhD; Faith D. Ottery MD, PhD; Irene Lidoriki Clinical Dietitian, PhD; Methodology: H Jager-Wittenaar; FD Ottery; Formal analysis and investigation: I Lidoriki; Michail Papapanou MD; Eleni Routsis MD; Maximos Frountzas MD; Konstantinos S. Mylonas MD, PhD; Writing - original draft preparation: I Lidoriki; Writing - review and editing: H Jager-Wittenaar; FD Ottery; Dimitrios Schizas MD, PhD; Funding acquisition: N/A; Resources: H Jager-Wittenaar; FD Ottery; I Lidoriki; D Schizas; Supervision: H Jager-Wittenaar; F D. Ottery; D Schizas.

## Declaration of competing interest

F.D. Ottery is creator and copyright holder of the PG-SGA® and co-owner and co-developer of the PG-SGA-based Pt-Global app/web tool. H. Jager-Wittenaar is co-developer of the PG-SGA-based Pt-Global app/web tool. The other authors report no conflicts of interests to declare.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.clnesp.2021.03.032>.

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