



ORIGINAL ARTICLE

An epidemiological evaluation of the prevalence of malnutrition in Spanish patients with locally advanced or metastatic cancer[☆]

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KEYWORDS

Prevalence;
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Summary

Objective: Malnutrition is frequent in cancer. The objective of this study was to determine the prevalence, in Spain, of malnutrition in cancer patients with advanced disease and to assess the therapeutic focus.

Methods: A total of 781 patients were evaluated to determine individual nutritional status using the Scored Patient Generated-Subjective Global Assessment (Scored PG-SGA) questionnaire. Almost 60% of the patients included were receiving cancer treatment.

Results: Patients with the highest weight loss were those with tumours of oesophagus (57%), stomach (50%) and larynx (47%). Serious eating problems were encountered by 68% of the patients; the principal problem being anorexia (42.2%). The median number of symptoms impeding food intake was 2. According to the Scored PG-SGA, 52% of the patients were moderately or severely malnourished and 97.6% required some form of nutritional intervention/recommendation.

Conclusions: (a) the majority of patients in the study needed nutritional intervention; (b) more than 50% had moderate or severe malnutrition; (c) the Scored PG-SGA is a useful and simple tool for evaluating nutritional status and contains additional information on nutritional recommendations; (d) nutritional evaluation of the cancer patients needs to be improved so as to offer better treatment of symptoms and to improve the patient's quality of life.

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Introduction

Progressive deterioration in nutrition in cancer patients is known as tumour cachexia. The clinical picture is characterised by anorexia, loss of weight and poor general status, all of which can lead to the death of the patient.¹ Although the principal clinical characteristics are anorexia and weight-loss, other complex clinical and analytical alterations are produced. These include asthenia, premature satiety, alterations in immune function, muscle atrophy, modifications in body image, anaemia, hypoalbuminaemia, hypolipoproteinaemia, hypertriglyceridaemia and hyperlactacidaemia.^{1,2} The causes of the malnutrition can be diverse, among which are the effects of the tumour, the site of the tumour, the production of specific cytokines and the effects of the anti-tumour therapy administered.^{1,3,4}

The cachexia-anorexia syndrome occurs frequently in cancer patients; the approximate incidence being 50%.^{5,6} The prevalence of cachexia/weight-loss varies as a function of the phase of the disease^{1,7} and the tumour site.⁸ In advanced phases, it is present in up to 80–90%^{1,7,8} of the patients, and between 20% and 25% of the cancer patients die directly as a result of the cachexia.^{1,9,10}

Malnutrition/weight-loss is associated with a lower survival, poor response and a decreased tolerance to the anti-cancer therapy. Further, there is a decrease in the patient's general status^{8,11–14} together with a higher health-care cost and longer hospitalisation.^{2,15}

Among the different prognostic factors such as the type of tumour, the stage of the disease, the general status of the patient and the weight-loss/malnutrition, it is the weight-loss/malnutrition that is the most amenable to intervention therapy.¹⁶

Despite the importance of the theme, there have been few large-scale studies assessing the prevalence of malnutrition in patients with cancer, and nutritional status has not been systematically evaluated in standard clinical practice in any of the major centres in Europe or the USA.¹⁷

All these considerations prompted us to perform the present study to determine the prevalence, in Spain, of malnutrition in patients with advanced cancer, and to evaluate the therapeutic focus in these patients.

Subjects and methods**Study population**

The design of the study was epidemiological, observational, cross-sectional and multi-centred. Included were 781 patients with advanced cancer receiving attention within the Spanish National Health System, as hospital-based, outpatient-clinic-based, or home-based care.

Inclusion period was between October 2001 and April 2002. The patients were recruited by clinical investigators in medical oncology, radiation

oncology, palliative care and home-based health-care departments. The sample is representative from the whole of Spain and included patients from 14 of the 17 Autonomous Communities. The criteria for inclusion were: patients > 18 years of age with tumours staged as locally advanced, metastatic and/or loco-regional relapse, receiving hospitalised attention or attending outpatient clinics or receiving home-based care. Excluded were those patients with concomitant diseases such as AIDS or other cachexia-inducing diseases and those who were unable to respond to the self-evaluation questionnaire, or those who chose not to provide consent to participation in the study.

Being an epidemiological study, the patients were not subjected to any special intervention. Oral consent was solicited to participation with anonymity of data guaranteed. The study fulfilled all current regulations governing non-intervention studies.

The overall funding, management and coordination of the study was by Bristol-Myers Squibb (Spain).

Instruments of measurement

The investigator (resident or clinical assistant) in Units of Medical Oncology, in Oncology-Radiotherapy and in Palliative Care needed to complete, at a single visit, the 2 parts: the data collection form (DCF) and the Scored PG-SGA.

The DCFs were designed to determine a series of epidemiological aspects of the nutritional status of the patient with cancer that was locally advanced or metastatic.

The investigator needed to fill-in all the data-boxes according to specific instructions contained in the DCF protocol. Patients were assessed consecutively by the investigating clinician.

The information recorded included identification of the investigator, coded identification of the patient, criteria of inclusion and exclusion, clinical history of the patient, type of tumour and its treatment, evaluation of the patient's physical status according to the ECOG/WHO guidelines and the Karnofsky scale, parameters of nutrition and attitudes that could have nutritional repercussions. The questionnaire concluded with a question relating to the subjective importance that the patient assigned to food intake as part of general well-being and current physical status.

To evaluate nutritional status we used the Scored Patient-Generated Subjective Global Assessment (PG-SGA) in its Spanish translated version. These Spanish version was revised by its author and has

not had any subsequent modifications. In brief, the PG-SGA consists of two sections. In the first section it is the patient that responds to the questions relating to weight, food intake, symptoms of difficulties in food intake, and functional capacity. Following the instructions that appear on the back of the questionnaire, the sum of the different items provides the 1st partial score codified as "A". The second part of the questionnaire relates to the disease, metabolic requirement and physical examination of the patients by the responsible physician. In this second part are three items mentioned above which, as well, receive a score according to the instructions on the back of the questionnaire and are coded as "B", "C" and "D". At the end of the test, the sum partial scores of the two sections A, B, C and D provide the total score which contains the information regarding the nutritional recommendations that would be required by the patient. The objective is to assess if the specific patient presents a risk of suffering complications because of the inadequate nutritional status, and if the patient would benefit from a nutritional treatment.

The partial scores of each section of the questionnaire and the total score are filled-in by the attending physician and checked by the Clinical Research Officer (CRO) coordinating the study, and using automated techniques.

Further, the Scored PG-SGA, again following the instructions on the back of the questionnaire provides for a subjective assessment by the patient with a classification of SGA A (well nourished), SGA B (moderately malnourished, or a suspicion of being so) and SGA C (severely malnourished).

Statistics and data entry

All patients included in the study ($n = 781$), once reviewed by the study's Scientific Committee, were considered valid for the analyses.

Statistical analyses and data manipulations were performed using the SAS[®] package (version 6.12; SAS Institute).

To achieve maximum reliability, the data from the DCFs were introduced into 2 databases by different people. Repeated comparisons between the two versions were made until a definitive version of the DCF data was obtained. The calculations to obtain partial and total scores for each of the boxes of the Scored PG-SGA were revised using established (automated) techniques.

All the variables collected were used to describe the characteristics of the study population.

The χ^2 -test was used to compare qualitative variables. Sub-group analysis was performed on dichotomised variables using the Student *t*-test. The minimum level for statistical significance was set at $P < 0.05$.

Results

Patient characteristics

The characteristics of the patients are summarised in Table 1. There were 490 males (64.4%) and 268 females (35.4%). The most frequent age of presentation was the decade of 60–69 years (30.5%).

The data were collected, mainly, by specialists in medical oncology and radiation oncology but with data from a small number of patients (5.3%) accessed by hospital personnel visiting the patient's home. The patients were documented either during their outpatient visit or on admission to hospital. Of the patients 59.3% were actively receiving cancer therapy, 32.8% were receiving symptom palliation therapy, and 3.9% were in the diagnostic phase. There were 54.5% of the patients receiving treatment with chemotherapy and 31.4% with radiotherapy. The combined treatment regimen most used was chemotherapy plus radiotherapy (94 cases) followed by chemotherapy plus palliative treatment of symptoms (34 cases).

The most common diagnosis was lung cancer (22.9%) followed by colo-rectal cancer (13.2%) and breast cancer (13%). Segregated with respect to gender, the most frequent tumour was lung cancer (31.8%) in the males and breast cancer in the females (37.3%) followed, in both genders, by colo-rectal cancer (14.7% and 11.2%, males and females, respectively). Lung cancer was the tumour most frequently recorded in the different specialist fields as well as in the 3 environments of treatment (hospital, outpatient clinic and home).

There were 56% of patients recorded as being in the metastatic phase; mainly those patients with cancer of the colon (89.5%). The most commonly registered locally advanced tumour was cancer of the oesophagus (73.1%), and the most frequently registered as loco-regional relapse was cancer of the stomach (20.6%).

There were 39.9% of patients defined as category 1 of the ECOG-WHO functional status i.e. limited in physical activity (but ambulatory and capable of performing light work). Although only 12.3% of the patients did not present symptoms (ECOG status 0), there were 69.1% who were capable of looking after themselves (ECOG 1-2) and only 2.6% were

considered incapacitated. The tumours with the highest ECOG status, i.e. the highest degree of incapacity were cancers of the lung, pancreas, oesophagus and stomach.

Data on nutritional aspects of the DCF

There were 70.4% of patients whose current weight was less than their usual weight, with 37% having lost weight in the previous 2 weeks. However, a body mass index (BMI; weight in kg/height in m²) < 18.5 was present only in 6.5% of the cases. The median weight loss relative to usual weight was 5.6%.

In general, the patients conceded food intake as having high importance (67.6% "high" and "very high") with the majority (95.3%) capable of feeding themselves without assistance.

With respect to drugs with nutritional repercussion, 16.3% of the patients were receiving megestrol acetate, 31.7% received corticoids, 12.3% psychopharmaceutical medications, 14.6% artificial nutrition including supplements (< 1000 kcal and/or 40 g proteins), enteral nutrition (> 1000 kcal and/or 40 g proteins) or parenteral nutrition and 45.7% were not receiving any drugs that could have an impact on nutrition. With respect to tumour site and impact on nutrition, 44% of patients with cancer of the pancreas were receiving treatment with megestrol acetate, 57.1% of patients with cancer of the oesophagus received artificial nutrition, 18.8% of the breast cancer patients received psychopharmaceutical medications. In lung cancer and prostate cancer, 47% and 38.9%, respectively, received treatment with corticoids.

The investigators considered that dietary advice would be recommendable for 61.1% of the patients and they considered that pharmacological treatment with megestrol acetate or corticoids would be indicated in 40.8% of them. The implementation of any pharmacological treatment with nutritional impact or dietary advice was left to clinical judgement of the attending physician.

Scored PG-SGA

There were wide variations in weight in the month prior to filling-in the questionnaire. There were 21.2% of patients who recorded weight increase, 30.6% no change, 26.1% a weight loss of < 5%, 15.5% a weight loss of between 5–10%, and 6.5% a weight loss of > 10%.

The tumours that related to the greater percentage of weight loss in the previous 2 weeks were those of the oesophagus (57.7%), stomach (50%) and

Table 1 Description of the population studied.

Characteristic	N
Males/females (%)	64.6/35.3
Age; median (range)	62 (19–92)
Patients alive %; alone/accompanied	7.3/92.6
<i>History of the disease</i>	
Duration; median months	9
Speciality; % (medical oncology/radiation oncology/palliative care)	52.6/35.1/12.7
Treatment base; % (outpatient/hospital/home base)	50.1/48.8/5.3
Status of disease; % (treatment/palliative/diagnosis/combination)	59.3/32.8/3.9/3.9
Most frequent tumour; % (lung/colo-rectal/breast/stomach)	22.9/13.2/12.9/4.4
Most frequent; males % (lung/colo-rectal/stomach/oesophagus)	31.8/14.7/5.1/5.1
Most frequent; females % (breast/colo-rectal/lung)	37.3/11.2/6.7
Current status; % (metastatic/locally advanced/relapse)	56.1/37.9/7.6
Current treatment; % (chemotherapy/radiotherapy/palliative/other)	54.5/31.4/28.0/9.5
ECOG functional status; % (0–1/2/≥3)	52.2/28.2/19.6
Karnofsky index; % (100/90–80/70–60/≤50)	7.2/45.6/32/15.1

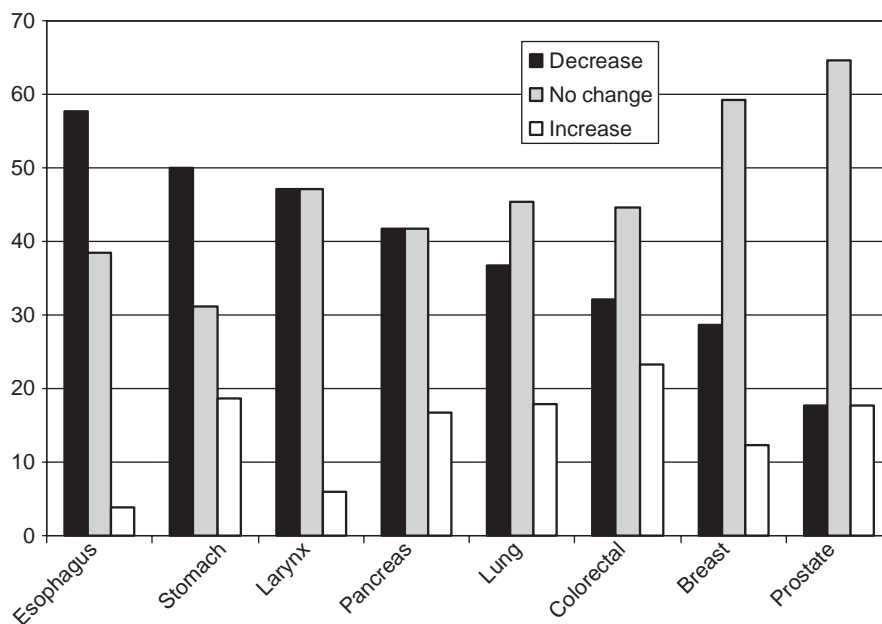


Figure 1 Weight change in the previous 2 weeks segregated according to tumour type.

larynx (47.1%) and the least were those of the prostate (17.6%) (Fig. 1). Tumours with loco-regional relapse where those with the greater frequency of weight loss (40%).

In the majority of patients (48%) food intake (as estimated by the patient) was lower-than-usual over the previous month. At the time of the survey, 56.3% of the patients had a moderate decrease in intake and nearly 14% ate practically nothing.

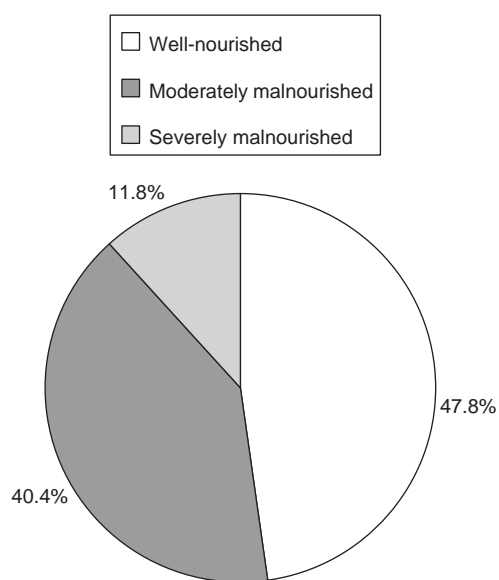
The median number of symptoms associated with difficulties in food intake was 2 (range 0–10). The

higher numbers of symptoms related to food-intake-difficulties were in patients with tumours of the pancreas, stomach and prostate. The principal factor impeding intake was loss of appetite (42.2%) followed by pain (22.3%), lack of taste in the food (21.6%), the sensation of early satiation (21.5%) and dryness of the mouth (20.2%) (Table 2).

The scored PG-SGA indicated that 52% of the patients were moderately or severely malnourished (Fig. 2) and 97.6% required some form of nutritional

Table 2 Percentage of patients with symptoms that impede food intake.

Symptoms	% patients
Lack of appetite; do not have desire to eat	42.2
Pain	22.3
Food tastes strange or tastes of nothing	21.6
I feel full rapidly	21.5
Dry mouth	20.2
Constipated	19.2
Nausea	17.9
Problems of swallowing	16.3
Vomiting	9.6
Mouth ulcers	9
Food smells are disagreeable	9
Diarrhoea	6.7
Other factors	9.6

**Figure 2** Scored PG-SGA evaluation.

recommendation to prevent, or reverse, the malnutrition (Fig. 3).

Scored PG-SGA and DCF

Cross-checking the data obtained from the DCF with that from the scored PG-SGA indicated that the patients in whom the nutritional recommendations are lower are those who are outpatients, and increased in those hospitalised and even more in those receiving home-based care ($P < 0.05$) (Table 3). As well, we observed that the

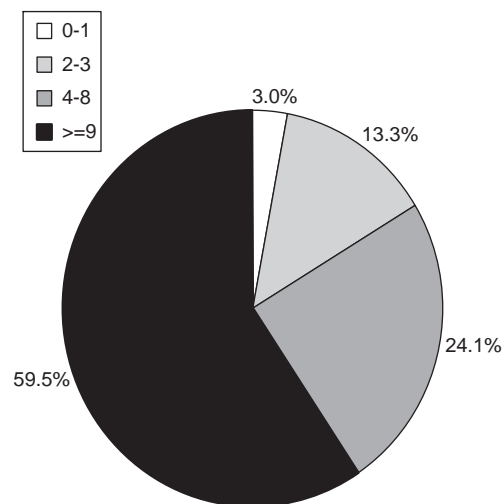


Figure 3 Nutritional recommendations. 0–1: does not require nutritional intervention. Return during treatment, 2–3: patients and relatives require nutritional education provided a specialist in nutrition (or other clinician) with pharmacological intervention based on the symptoms and the patient's data, 4–8: require intervention of a specialist in nutrition in conjunction with the attending physician based on the patients' data and symptoms, >9: indicates a critical need to improve the management of the patient's symptoms together with a nutritional intervention.

patients who had greater nutritional requirements were those who had poorer ECOG status, not only those with locally advanced disease but also those with metastases. In those cases in whom the nutritional requirements were 0–1, the median ECOG was 0, those between 2 and 8, the ECOG was 1, and those ≥ 9 , the ECOG was 2.

When we analysed the scores obtained from the scored PG-SGA with respect to nutritional recommendations for each of the tumour sites we observed that the majority of patients with cancer of the stomach, oesophagus and pancreas had a critical necessity for improvement of the symptom management and/or nutritional/pharmacological intervention, or presented with scores > 9 (Table 4).

When the subjective evaluation of nutritional status performed by the attending physician was compared with the nutritional recommendation obtained from sum of the scores of the scored PG-SGA for each patients, we observed that there was a high concordance in the groups evaluated as SGA B & C with respect to the nutritional recommendations that the patients required ($P < 0.001$). In the case of the patients evaluated as severely malnourished and moderately malnourished (SGA C and B, respectively) 100% and 99.4% of

Table 3 Nutritional recommendations on Scored PG-SGA, and the treatment environment.

Recommendations	Outpatient (%)	Hospitalised (%)	Home-based care (%)
0–1	5.5	2.6	0
2–3	14.7	11.5	0
4–8	28.2	23	13.7
≥9	51.48	62	86.2

Table 4 Nutritional recommendations on the Scored PG-SGA, and tumour site.

Recommendations	Pancreas (%)	Oesophagus (%)	Stomach (%)	Lung (%)	Breast (%)	Colon (%)
0–1	0	0	0	1.8	11.4	1.9
2–3	0	8.7	3.2	12.2	23.0	12.4
4–8	17.3	8.7	19.3	29.4	19.7	30.7
≥9	82.6	82.6	77.4	56.4	45.8	53.8

Table 5 Nutritional recommendations on the Scored PG-SGA and the SGA.

Recommendations	Well nourished (%)	Moderately malnourished (%)	Severely malnourished (%)
0–1	6.0	0	0
2–3	26.3	0.8	0
4–8	40.2	11.3	0
≥9	27.3	88.1	100

the patients, respectively, had a necessity for improvement in the management of their symptoms and required nutritional intervention.

In the group evaluated as well nourished (SGA A) is concordance was not observed because a high percentage of patients (65%) needed nutritional intervention or evaluation by a specialist in nutrition (Table 5).

Discussion

The objective of the present study was to determine the prevalence, in Spain, of malnutrition in patients with advanced cancer. It is well documented that the malnutrition has a negative impact on the well-being of the patient, as well as on the clinical evolution of the disease.^{2,18–23} Also,

weight loss is considered prognostic of decreased survival and a predictor of poor response to treatment.⁸

To determine the real presence of malnutrition it is necessary to perform an extensive nutritional evaluation. This process of defining nutritional status includes detailed medical history with respect to drugs and nutritional intake, a physical examination together with some measurements of anthropometric and laboratory parameters.²⁴ The objective is to classify patient populations and individuals according to their nutritional status so as to plan specific actions. There is a wide variety of methods with which to evaluate nutrition, and among them the most important are the Subjective Global Assessment (SGA) the Scored Patient Generated SGA, and the Mini Nutritional Assessment.^{25,26} The tool that has been most widely used is the Scored PG-SGA. This measurement tool

enables us to identify early malnutrition, it is easy to apply and, further, correlate well with results obtained in more regulated nutritional evaluations.

The PG-SGA and Scored PG-SGA are based on the SGA designed by Detsky et al.;^{27,28} a test that has been widely validated. The Fox Chase Cancer Center modified the original SGA to produce the PG-SGA to be used in patients with cancer and which actively involves the patient in the evaluation.²⁹ This aspect is reflected in the first part of the questionnaire while the physician fills-in the rest of the evaluation. Hence, the time needed to complete the assessment is reduced. It is a questionnaire that can be performed not only in hospitalised patients but also in those attending the outpatient clinic. The SGA classifies the patients into three possible groups: A (well nourished), B (moderately malnourished or at risk of malnourishment) and C (severely malnourished). More recently, the same research group developed the Scored PG-SGA that is capable not only of discriminating patients with high risk of malnutrition, but also of generating nutritional intervention options that would minimise the complications resulting from the malnutrition.^{30,31}

Persson et al.¹⁸ applied the PG-SGA in 87 patients with cancer of the digestive tract, or of the urinary tract, and concluded that the nutritional status results were easy to use and related well to prognosis.

In a recent study by Bauer et al.³² conducted in 72 patients with cancer, the sensitivity and specificity between the Scored PG-SGA and the SGA were compared. The results indicated that the Scored PG-SGA had a sensitivity of 98% and a specificity of 82% in predicting the SGA classification.

In a study of 30 Spanish patients diagnosed as having cancer and treated with chemotherapy and/or radiotherapy, the PG-SGA tool was applied by medical oncologists and specialists in clinical nutrition. Further, anthropometric and biochemical evaluations were conducted. The study showed that the nutritional evaluation with the PG-SGA had a high correlation with anthropometric and biochemical parameters when applied by the medical specialist in nutrition; the diagnosis of moderate or severe malnutrition was 26% with anthropometric/biochemical measurements and 30% when diagnosed with the PG-SGA. Further, there was a high degree of sensitivity when applied by the medical oncologists since no single patient with malnourishment, or suspicion of malnourishment, had been missed.³³

We have used the Scored PG-SGA without any major difficulties. In our study, none of the clinical investigators, even those without previous experience of nutritional evaluations, had expressed any

difficulties with applying the Scored PG-SGA. Similarly, none of the patients appeared to have any difficulties with the questionnaire. The time required to complete the questionnaire was less than 10 min in the vast majority of cases. Additional data are obtained on food intake and the functional status of the patient and, as well, provides information on the nutritional recommendations that may be needed by the patient. Because of its efficacy and ease of application, the Working Group of Nutrition and Cancer of the Spanish Society of Basic and Applied Nutrition selected this methodology for the screening for malnutrition in patients with cancer.³⁴

In our study, 52% of the patients were moderately, or intensely, malnourished. The study of Bauer et al.³² documented that only 25% of the patients were well nourished and that 75% were malnourished (59% moderately malnourished and 17% severely malnourished).

Thorensen et al.³⁵ compared the objective method of evaluation of nutritional status with the SGA in 46 hospitalised patients with advanced cancer and in 65% of whom there was evidence of moderate or severe malnourishment. The results showed a high correlation between the two methods. We elected to assess patients with tumours that were locally advanced, metastatic or with loco-regional relapse since, in accordance with the published literature, the levels of malnutrition are expected to be elevated. Our findings did not show excessively high levels despite approximately 50% of our patients being on outpatient regimens, and the majority of the patients were receiving an active treatment for the cancer due to the majority of the patients were recruited from the services of Medical Oncology and Oncology-Radiotherapy. As such, the functional status we observed was very acceptable, except in those cases of pancreatic tumours.

The increase in the morbido-mortality associated with weight-loss has been well documented, as has the relationship between the grade of weight-loss prior to the diagnosis and the gravity of the disease.^{8,26} Although in our study there were only a few patients in the diagnostic phase, 48.1% of the patients studied had lost weight in the month prior to completing the questionnaire.

The majority of tumours were in the metastases phase or were in the stage of loco-regional relapse (20% of the total); especially cancers of the stomach and the oesophagus with which an elevated weight-loss is associated. As described in the early studies of De Wys et al.⁸ tumours of the gastrointestinal tract are those with the high incidence of malnutrition and with high percentages of weight-loss.

Evidence suggests that >50% of the general population in Spain is overweight. Hence, it is of considerable relevance in patients with cancer that the weight-losses observed, relative to the high body mass index (BMI) of the population, are only seen to be clearly decreased in cases of extreme weight loss. Indeed, in our study, 70% of the patients had lost weight but only 6.5% had a BMI of <18.5.³⁶

In the study of Bauer et al.,³² the symptoms that adversely affect food intake were similar to those found in our study: anorexia was foremost followed by nausea, pain and vomiting. One of the symptoms that most-frequently affects the cancer patient is anorexia and is, as well, the symptom that, most commonly, adversely affects food intake.³²⁻³⁹ It is present in 15-25% of the patients with cancer at the time of diagnosis, and is almost universal among patients with advanced disease.

In our study, a majority of patients (59.3%) were receiving active oncology treatment; mainly, chemotherapy and/or radiotherapy surely due to the low participation of Units of Palliative Care. The secondary effects of these treatments in relation to nutritional alterations are well documented.^{25,38,39} The severity of the secondary effects resulting from chemotherapy and/or radiotherapy depend on several factors such as cytostatic agents used, the area irradiated, the doses and schemes employed, the number of cycles or weeks of treatment, the individual's response, the concomitant therapies and the general status of the patient. Further, a poor nutritional status (mainly, protein deficiency) or a significant weight loss can affect the pharmaco-kinetic and pharmaco-dynamic parameters of the cytotoxic drugs which, in turn, exacerbate their toxicity and reduce the tumour response to the drugs.^{8,22} All of these adversely affect the nutritional status and a vicious circle begins.

Comparing the results obtained with the SGA, we note that the concordance was very good with the score obtained in groups B and C (malnutrition present), but not in group A (no malnutrition). As such, the method that incorporates the scoring system appears to carry more, and better, information on the wider aspects of nutrition. This could have a better clinical usefulness since therapeutic attitudes can be clarified by this measurement. Another point arising from this evaluation is the possibility of underestimating the extent of malnutrition among cancer patients and, hence, the correlation between the patients evaluated subjectively (such as the SGA A group of patients) and the recommendations for nutritional intervention required by the patients would be poor.

A high percentage of the patients in the present study appeared to require nutritional education, dietary advice and/or drugs to control their symptoms. What is clear is that food intake was considered, by the majority of the patients, to be very important in maintaining an adequate general status as well as in assisting in maximising their benefits from the scheduled oncology treatment.

Conclusions

In our experience the Scored PG-SGA is a very useful tool. It is easy to use by health-care professionals who are not nutrition experts and enables the conduct of screening for malnutrition in patients with cancer. Further, additional information can be derived on the nutritional recommendations that each patient may need.

An elevated number of the patients in this study was considered as being moderately, or severely, malnourished. They presented with a variety of symptoms that impede food intake and a significant proportion needed nutritional intervention; whether dietary recommendations and/or drugs to control the symptoms.

Nutritional evaluation is vital in detecting those patients at risk of malnutrition or with current malnutrition. Identification of such conditions as early as possible is essential if nutritional treatment is to be implemented so as to assist the cancer treatment, and to improve the patient's quality of life.

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Appendix C

Scored Patient-Generated Subjective Global Assessment (PG-SGA)

Patient ID Information

History (Boxes 1-4 are designed to be completed by the patient.)

1. Weight (See Worksheet 1)
In summary of my current and recent weight:
I currently weigh about _____ kg
I am about _____ cm tall
One month ago I weighed about _____ kg
Six months ago I weighed about _____ kg
During the past two weeks my weight has:
[] decreased (1) [] not changed (0) [] increased (0)
Box 1 []

2. Food Intake: As compared to my normal intake, I would rate my food intake during the past month as:
[] unchanged (0)
[] more than usual (0)
[] less than usual (1)
I am now taking:
[] normal food but less than normal amount (1)
[] little solid food (2)
[] only liquids (3)
[] only nutritional supplements (3)
[] very little of anything (4)
[] only tube feedings or only nutrition by vein (0)
Box 2 []

3. Symptoms: I have had the following problems that have kept me from eating enough during the past two weeks (check all that apply):
[] no problems eating (0)
[] no appetite, just did not feel like eating (3)
[] nausea (1) [] vomiting (3)
[] constipation (1) [] diarrhea (3)
[] mouth sores (2) [] dry mouth (1)
[] things taste funny or have no taste (1) [] smells bother me (1)
[] problems swallowing (2) [] feel full quickly (1)
[] pain; where? (3) _____
[] other** (1) _____
** Examples: depression, money, or dental problems
Box 3 []

4. Activities and Function: Over the past month, I would generally rate my activity as:
[] normal with no limitations (0)
[] not my normal self, but able to be up and about with fairly normal activities (1)
[] not feeling up to most things, but in bed or chair less than half the day (2)
[] able to do little activity and spend most of the day in bed or chair (3)
[] pretty much bedridden, rarely out of bed (3)
Box 4 []

Additive Score of the Boxes 1-4 [] A

The remainder of this form will be completed by your doctor, nurse, or therapist. Thank you.

5. Disease and its relation to nutritional requirements (See Worksheet 2)
All relevant diagnoses (specify) _____
Primary disease stage (circle if known or appropriate) I II III IV Other _____
Age _____ Numerical score from Worksheet 2 [] B
6. Metabolic Demand (See Worksheet 3) Numerical score from Worksheet 3 [] C
7. Physical (See Worksheet 4) Numerical score from Worksheet 4 [] D

Global Assessment (See Worksheet 5)
[] Well-nourished or anabolic (SGA-A)
[] Moderate or suspected malnutrition (SGA-B)
[] Severely malnourished (SGA-C)
Total PG-SGA score
(Total numerical score of A+B+C+D above) []
(See triage recommendations below)

Clinician Signature _____ RD RN PA MD DO Other ___ Date _____

Nutritional Triage Recommendations: Additive score is used to define specific nutritional interventions including patient & family education, symptom management including pharmacologic intervention, and appropriate nutrient intervention (food, nutritional supplements, enteral, or parenteral triage). First line nutrition intervention includes optimal symptom management.
0-1 No intervention required at this time. Re-assessment on routine and regular basis during treatment.
2-3 Patient & family education by dietitian, nurse, or other clinician with pharmacologic intervention as indicated by symptom survey (Box 3) and laboratory values as appropriate.
4-8 Requires intervention by dietitian, in conjunction with nurse or physician as indicated by symptoms survey (Box 3).
≥ 9 Indicates a critical need for improved symptom management and/or nutrient intervention options.

Worksheets for PG-SGA Scoring

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Boxes 1-4 of the PG-SGA are designed to be completed by the patient. The PG-SGA numerical score is determined using 1) the parenthetical points noted in boxes 1-4 and 2) the worksheets below for items not marked with parenthetical points. Scores for boxes 1 and 3 are additive within each box and scores for boxes 2 and 4 are based on the highest scored item checked off by the patient.

Worksheet 1 - Scoring Weight (Wt) Loss

To determine score, use 1 month weight data if available. Use 6 month data only if there is no 1 month weight data. Use points below to score weight change and add one extra point if patient has lost weight during the past 2 weeks. Enter total point score in Box 1 of the PG-SGA.

Wt loss in 1 month	Points	Wt loss in 6 months
10% or greater	4	20% or greater
5-9.9%	3	10 -19.9%
3-4.9%	2	6 - 9.9%
2-2.9%	1	2 - 5.9%
0-1.9%	0	0 - 1.9%

Score for Worksheet 1

Record in Box 1

Worksheet 2 - Scoring Criteria for Condition

Score is derived by adding 1 point for each of the conditions listed below that pertain to the patient.!

Category	Points
Cancer	1
AIDS	1
Pulmonary or cardiac cachexia	1
Presence of decubitus, open wound, or fistula	1
Presence of trauma	1
Age greater than 65 years	1

Score for Worksheet 2 =

Record in Box B

Worksheet 3 - Scoring Metabolic Stress

Score for metabolic stress is determined by a number of variables known to increase protein & calorie needs. The score is additive so that a patient who has a fever of > 102 degrees (3 points) and is on 10 mg of prednisone chronically (2 points) would have an additive score for this section of 5 points.

Stress	none (0)	low (1)	moderate (2)	high (3)
Fever	no fever	>99 and <101	≥101 and <102	≥102
Fever duration	no fever	<72 hrs	72 hrs	> 72 hrs
Steroids	no steroids	low dose (<10mg prednisone equivalents/day)	moderate dose (≥10 and <30mg prednisone equivalents/day)	high dose steroids (≥30mg prednisone equivalents/day)

Score for Worksheet 3 =

Record in Box C

Worksheet 4 - Physical Examination

Physical exam includes a subjective evaluation of 3 aspects of body composition: fat, muscle, & fluid status. Since this is subjective, each aspect of the exam is rated for degree of deficit. Muscle deficit impacts point score more than fat deficit. Definition of categories: 0 = no deficit, 1+ = mild deficit, 2+ = moderate deficit, 3+ = severe deficit. Rating of deficit in these categories are *not* additive but are used to clinically assess the degree of deficit (or presence of excess fluid).

Fat Stores:					Fluid Status:				
orbital fat pads	0	1+	2+	3+	ankle edema	0	1+	2+	3+
triceps skin fold	0	1+	2+	3+	sacral edema	0	1+	2+	3+
fat overlying lower ribs	0	1+	2+	3+	ascites	0	1+	2+	3+
Global fat deficit rating	0	1+	2+	3+	Global fluid status rating	0	1+	2+	3+

Muscle Status:

temples (temporalis muscle)	0	1+	2+	3+
clavicles (pectoralis & deltoids)	0	1+	2+	3+
shoulders (deltoids)	0	1+	2+	3+
interosseous muscles	0	1+	2+	3+
scapula (latissimus dorsi, trapezius, deltoids)	0	1+	2+	3+
thigh (quadriceps)	0	1+	2+	3+
calf (gastrocnemius)	0	1+	2+	3+
Global muscle status rating	0	1+	2+	3+

Point score for the physical exam is determined by the overall subjective rating of total body deficit.

No deficit	score = 0 points
Mild deficit	score = 1 point
Moderate deficit	score = 2 points
Severe deficit	score = 3 points

Score for Worksheet 4 =

Record in Box D

Worksheet 5 - PG-SGA Global Assessment Categories

Category	Stage A Well-nourished	Stage B Moderately malnourished or suspected malnutrition	Stage C Severely malnourished
Weight	No wt loss OR Recent non-fluid wt gain	-5% wt loss within 1 month (or 10% in 6 months) OR No wt stabilization or wt gain (i.e., continued wt loss)	> 5% wt loss in 1 month (or >10% in 6 months) OR No wt stabilization or wt gain (i.e., continued wt loss)
Nutrient Intake	No deficit OR Significant recent improvement	Definite decrease in intake	Severe deficit in intake
Nutrition Impact Symptoms	None OR Significant recent improvement allowing adequate intake	Presence of nutrition impact symptoms (Box 3 of PG-SGA)	Presence of nutrition impact symptoms (Box 3 of PG-SGA)
Functioning	No deficit OR Significant recent improvement	Moderate functional deficit OR Recent deterioration	Severe functional deficit OR recent significant deterioration
Physical Exam	No deficit OR Chronic deficit but with recent clinical improvement	Evidence of mild to moderate loss of SQ fat &/or muscle mass &/or muscle tone on palpation	Obvious signs of malnutrition (e.g., severe loss of SQ tissues, possible edema)

Global PG-SGA rating (A, B, or C) =

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