



# Cancer and malnutrition – study of the nutritional status of patients on oncological wards versus their personal-reflection

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## Abstract

**Background:** Every malignant illness goes along with negative effects of the disease and the treatment that may result in malnutrition. The aim of this study is to find out whether the patients recognize this risk by themselves and whether they are alert and search for nutritional advice.

**Methods:** The SGA-questionnaire was used to interview patients in different oncological wards at a German university hospital. As a special feature, the subjective assessment of the nutritional status was answered by the patients to see how they assess their own situation.

**Results:** In total, 97 patients completed the questionnaire. 46 patients were categorized as having malnutrition. However, 67 respondents consider themselves as well fed. Overall, 50 respondents reported they had symptoms associated with nutrition intake.

**Conclusion:** Objective and subjective assessments of malnutrition do not match in several cases. Without regular assessment, risk of malnutrition and even cachexia remain unnoticed from the side of the patients as well as from the doctors.

**Keywords:** undernourishment, malnutrition, cancer, cachexia, screening, weight loss

## Introduction

Diet plays an important role in cancer therapy. The severity of the nutritional problems of a tumor disease partly depends on its location. However, cancer or its treatment may lead to cachexia in all types of cancer [1–3]. All in all, there are major problems with malnutrition among patients in German hospitals, and the risk of malnutrition is particularly high at oncology wards (38%) [4, 5]. The high prevalence of malnutrition may also be related to the fact that many physicians do not have the necessary knowledge of nutrition to be able to advise their patients adequately [6–8]. Malnutrition may lead to a weakening of the patient. This results in an increase in side effects and complications (e.g. a poorer tolerance to the therapy) of cancer treatments [9]. Therefore, admission to a hospital may increase and hospital stays may become longer. In addition, the quality of life is lowered when a person is not sufficiently nourished as malaise, fatigue, and depression appear or get stronger [10]. Especially elderly patients are at risk of malnutrition and its sequela [11]. One of the main reasons for the debilitating effects of malnutrition is early sarcopenia or cachexia, which also may arise while the patient's weight and body mass index (BMI) are within the normal or in an increased range [12]. Both malnutrition and sarcopenia are highly associated with increased mortality and worse prognosis [13–17]. Vice versa, individual nutritional therapy may improve quality of life and functional status [18]. The proposed funds to reduce cachexia is nutritional therapy based on structured assessments for all cancer patients. It is indicated by

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a positive screening result of one of the approved screening methods for malnutrition [Malnutrition-Universal-Screening-Tool (MUST), Nutritional Risk Screening (NRS 2002), subjective global assessment (SGA)]. However, the SGA and the measurement of body impedance take time and resources from nursing staff, physicians, or dietitians.

The aim of our study was to find out whether alternative, time-saving procedures (regular weight control, subjective assessments/statements from patients) could also be suitable to determine the risk of cachexia.

## Methods

From December 2018 to February 2019, a modified nutritional screening as part of a regular cancer center certification was introduced at four cancer wards (hematology/oncology, gynecological and surgical ward, and the oncologic day hospital) of a German university hospital. The modification consisted in asking the patients to make a subjective assessment of their nutritional status using the SGA screening tool as a self-assessment. Therefore, they had to assess their weight history within the last 6 months and assign themselves to one of the three groups from the SGA: "well fed", "moderately malnourished" and "severely malnourished". In addition to weight change, the SGA screening includes food intake, gastrointestinal symptoms, the patient's performance and the effect of the underlying disease on nutrient metabolism. In addition to the SGA screening, the patients were asked whether they would like to receive nutritional advice. It was also asked whether the doctors had made recommendations for nutritional advice or whether specific nutritional advice had been arranged. In the following, the nutritional advisors (= study organizers) made their own assessment of the weight history of the respective patient since the diagnosis of the disease up to the present time (in the course of therapy approx. 6 months after the start). These two assessments could be compared in order to estimate if the patients are able to assess their nutritional status accurately or inaccurately.

The physical examination was conducted by the nutritional advisors. The patients were examined for ankle oedema, anasarca, and ascites. Further signs of malnutrition were identified through the loss of muscle and fat mass.

However, since the physical examination only reflects the status quo and an assessment of the reduction in fat and muscle mass within the last 6 months has not been possible during a one-time conversation, a subjective evaluation by the patients was used.

Patients of full age, who currently still had a treatment for a malignant disease and had completed the questionnaire, were included in the evaluation.

The collected data were analyzed retrospectively and anonymously. An aim was to find out whether patients recognize that they have an increased risk of malnutrition or manifest malnutrition.

The SGA screening discerns three different weight losses: < 5% = low weight loss, 5–10% = potentially significant weight loss, > 10% = significant weight loss. By definition, tumor cachexia

is associated with a 5% weight loss within 6 months or a BMI of less than 20 kg/m<sup>2</sup> due to weight loss or severe muscle breakdown [19, 20]. In this work, the definitions "cachexia" (weight loss > 5% in 6 months) and "severe cachexia" (weight loss > 10% in 6 months) were used to better represent the groups of the SGA screening.

## Statistics

Data from the SGA questionnaires were transferred to and descriptively evaluated in IBM SPSS Statistics 25.

Absolute and relative frequencies and, if necessary, minimum, maximum, and mean were shown for the respective items.

## Ethical vote

All procedures performed in the study met the ethical standards of the institutional research commission (Ethics Committee of the University Hospital Jena, Reg.-No.: 2019-1585-Daten). The collected data were evaluated retrospectively and anonymized.

## Results

### Demographic data

All in all, 97 patients were included. 44 (45%) male and 53 (54%) female patients. The median age was 62 years. For further demographic and cancer data, see ♦ Table 1 and 2.

### Weight, symptoms, and physical examination

Of all 97 patients, 46 (47%) lost more than 5% of their weight within six months. 34 (35%) of these patients lost more than 10% of their weight and were therefore considered severely malnourished. In this group, there were ten patients with a weight loss of more than 20%. All of those were patients on the hematology/oncology ward who suffered from gastrointestinal tumors. The largest percentage of weight loss was reported by a patient who lost 39% (28 kg) of his original weight within six months. These results were calculated based on the patient's information of their weights over the past 6 months. None of these potentially significant or significantly malnourished patients indicated that they had actively received nutritional advice.



50 (52%) patients reported having at least one of the following nutrition associated symptoms during therapy: loss of appetite, nausea, vomiting, and diarrhea. In addition, some patients showed other symptoms such as dysgeusia and other symptoms (constipation, dyspnea, gastric pressure, mucositis, xerostomia, heartburn) (♦ Figure 1).

By questioning the patients if they like to have a nutrition counselling, only six patients reported having planned to ask for a nutritional consultation. All of them had a severe cachexia (weight loss > 10%). In addition, 12 patients said they would use it if they knew whom to contact.

♦ Table 3 gives the data of the physical examination. While ankle oedema is still relatively common in moderate to severe form, patients had rarely problems with anasarca or ascites.

### Self-assessment of the patients

Despite the high number of patients with cachexia, 67 (69%) patients stated that they considered themselves to be well nourished. Of the 67 patients who grade themselves to be well-nourished, 25 (37%) had cachexia. Of the 34 patients with a severe cachexia 14 (41%) persons estimated their nutritional status as good. From the 10 patients who lost more than 20% of weight, five marked that they are well-fed. In total, only 20 patients with cachexia assessed themselves as malnourished.

However, the patients at the various wards perceived their nutrition status very differently. 48% of cachectic patients in the hematology/oncology ward and 46% of cachectic patients from the oncologic day hospital classified themselves as malnourished. In contrast, only 25% of the patients in the gynecological tumor ward indicated themselves as malnourished, while no patient in the surgical ward saw himself or herself as malnourished (♦ Table 4). On the other hand, ten patients, who classified themselves as malnourished, did not correspond to the medical data. There was a total of 45 patients with a BMI > 25 kg/m<sup>2</sup> (32 with overweight, 13 with obesity). Of these, 14 had a weight loss > 5% within six months, resulting in cachexia. Five out of these 14 patients said they were still well fed, as they still had a high weight despite the weight loss. They also explained that they considered this weight loss to be a positive effect as they otherwise found it very difficult to lose weight.

Gender (n [%])	
total	97 [100]
female	53 [55]
male	44 [45]
Age (years)	
minimum	28
maximum	86
mean	62
SD	14
Current weight (kg)	
minimum	42
maximum	125
mean	70
SD	15
Size (m)	
minimum	1,50
maximum	1,97
mean	1,70
SD	0,09
BMI (kg/m <sup>2</sup> )	
minimum	14
maximum	41
mean	25
SD	5

Tab. 1: Characteristics of the consulted patients  
SD = standard deviation

A further self-assessment was made about the decrease of fat and muscle mass of the patients within the last 6 months (♦ Table 5). Almost half of the patients (42%) reported moderate to severe loss of muscle mass. On the other hand, the majority of patients (78%) indicated that they had no or only a slight loss of fat mass.

Diagnosis (n [%])	Hematology/ oncology ward	Day hospital	Gynecological ward	Surgical ward
total	53 [55]	23 [24]	16 [17]	5 [5]
gastrointestinal tumors	22 [23]	6 [6]		4 [4]
head and neck cancer	3 [3]	2 [2]		
lung cancer	5 [5]			
breast cancer			6 [6]	
lymphoma/leukemia	19 [20]	12 [12]		
urological/urogenital cancer	1 [1]			
gynecological cancer		1 [1]	9 [9]	
other	3 [3]	2 [2]	1 [1]	1 [1]

Tab. 2: Oncological diagnoses in various oncological wards

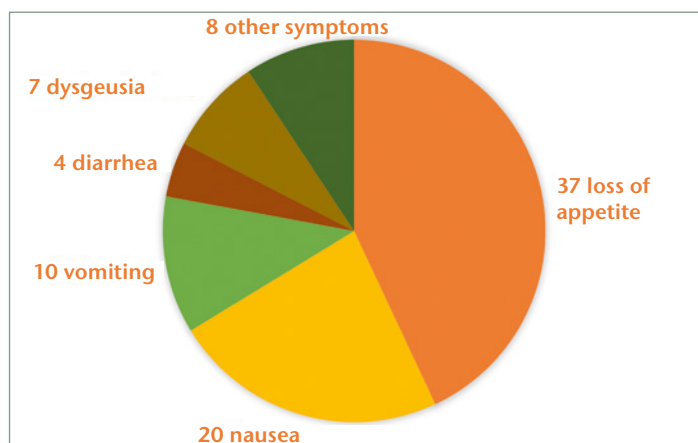


Fig. 1: Number of patients with respective symptoms

	Moderate to severe (n [%])	Low to normal (n [%])
ankle oedema	17 [18]	80 [83]
anasarca	2 [2]	95 [98]
ascites	6 [6]	91 [94]

Tab. 3: Physical examination of the patients rated by the nutritionists (N = 97)

## Discussion

The aim of this study was to find out to which extent patients with cancer are able to assess their nutritional status by themselves.

Almost half of the patients had cachexia and many of them had severe cachexia (34 out of 46 patients). The highest prevalence for cachexia was found in patients with gastrointestinal tumors. This prevalence has already been presented by other authors and is due to the direct influence of the disease on food intake and the indirect and direct effects of cancer treatment [11].

Only about 47% of patients with cachexia also regard themselves as malnourished. Accordingly, the central message of our study is that patients are not able to correctly rate their own nutri-

tional status even in case of severe cachexia. If there is no awareness of one's own risk of malnutrition, patients will not actively ask for support in their treatment. In addition, the patients who wanted to ask for help did not know whom they should contact. Especially patients who had suffered with overweight rated the loss as positive and did not recognize the risks. Based on our data, we cannot analyze why patients with a large weight loss do not react by themselves. An explanation could be that they rely on specialists who control all relevant data and actively deal with serious problems (which also includes weight loss). Another explanation could be that patients do not recognize the consuming nature of their illness or consider their loss of weight to be positive if their weight is too high from their point of view.

There were ten patients who considered themselves to be malnourished, but from a nutritional perspective, they were not. Three of these patients reported that they have been very concerned with their diet since the illness because they want to strengthen their body as much as possible in order to survive the intensive therapy better. This group of patients should also be detected in a screening as they might benefit much from professional help instead of often dubious information from the internet [21]. A former survey has shown that nearly 60% of cancer patients had questions relating to their nutrition. A quarter of them would like to have advice concerning weakness and fatigue [22].

The most frequently mentioned symptom associated with dietary problems was the loss of appetite, which was also related to dysgeusia in seven patients. Both symptoms should be

	Method	Nutritional status	Total	Hematology/ oncology ward	Day hospital	Gynecological tumor center	Surgical ward
Patients n [%] <sup>a</sup>	SGA	cachexia	46 [47]	29 [30]	11 [11]	3 [3]	3 [3]
		severe cachexia <sup>b</sup>	34 [35]	22 [23]	9 [9]	1 [1]	2 [2]
	Patient- reported	patient-reported as well-fed	67 [69]	35 [36]	15 [16]	12 [12]	5 [5]
		patient-reported as malnourished	30 [31]	18 [19]	8 [6]	4 [4]	0
	SGA + patient- reported	cachexia and patient-reported as malnourished	20 [21]	14 [14]	5 [5]	1 [1]	0

Tab. 4: Patients suffering from cachexia and the patients' view of their nutritional status (N = 97)

cachexia: weight loss > 5% in 6 months; severe cachexia: weight loss > 10% in 6 months

<sup>a</sup> based on the total number of 97 patients

<sup>b</sup> included in the 46 cachexia patients



	Moderate to severe n [%]	Low to normal n [%]
loss of fat mass	21 [22]	76 [78]
loss of muscle mass	41 [42]	56 [58]

Tab. 5: Subjective assessment by the patients of the loss of fat and muscle mass within the last 6 months (N = 97)

included in a screening tool and should be taken seriously by professionals, as they could be an early mark of oncoming dietary problems. Unfortunately, both symptoms are not easy to alleviate and more effort may be necessary for a comprehensive medical as well as a dietary approach.

Loss of appetite and weight loss are common in advanced tumors (in 80% of the cases) and are defined as anorexia-cachexia syndrome. Due to the frequent occurrence, it is recommended to consider the effects of the syndrome in addition to the diagnosis. This should be done in order to be able to use a therapeutic approach that is as quick and helpful as possible [23]. An untreated tumor cachexia is accompanied by a weight loss of 5% within 6 months or a BMI of less than 20 kg/m<sup>2</sup> due to loss of weight or/and muscles [19, 20]. The resulting malnutrition can weaken the patient. This leads to an increase of chemotherapy-associated side effects and complications in the course of cancer treatments [9].

## Limitation

In the study, each patient was interviewed and examined only once by the nutritionists who conducted the study while the therapy was already in progress. There was no multiple examination by professionals (e.g. by the physicians, the nursing staff, or the nutritionists) in which a physical follow-up, especially considering fat and muscle mass, was carried out. Because of this, it was not possible to give an accurate assessment of the loss of fat and/or muscle mass. Based on the weight information given by the patient at the time of diagnosis and at the current time, it was possible to estimate how much weight a patient had lost and whether these are critical signs of malnutrition or cachexia. However, it could not be deviated whether the patient had lost a lot of fat, muscle, or both. For this reason, the patient had to self-assess these losses within the past 6 months. This can lead to inaccuracies because the patient's self-assessment can be subject to strong fluctuations, depending on what they perceive as a large or small decrease.

This inaccuracy could be introduced in a subsequent study through more frequent monitoring of the physical examinations (e.g. at the time of diagnosis, start of therapy, and end of therapy). In this context, a more frequent questioning of patients through SGA screening could also be introduced. Although this would place a higher burden on the study participants, malnutrition could be recognized and treated earlier.

## Conclusion

In summary, cachexia, which was determined in almost 50% of patients, has a great importance in cancer treatment. Even if there is a strong evidence of cachexia being detected through regular weight measurements, nutritional consequences seem to be underdiagnosed and advice and treatment may not be initiated. Another problem is that many patients do not notice that they are malnourished. In addition, overweight patients even considered weight loss as positive, as they often had problems to lose weight. These patients do not perceive the risk of malnutrition. In order to be able to completely record malnutrition and initiate treatment, the introduction of nutritional screening in oncological wards is obligatory. For the purpose of a successful treatment of recorded malnourished patients, a structured procedure of early information on healthy nutrition, early nutritional advice, and consistent nutritional medical treatment of weight loss have to be combined. It is also important for oncological patients that they are informed about nutritional symptoms, problems with nutrient intake, and weight loss from the start of therapy, as well as that they can receive nutritional advice right from the start. For this, information and contact details must be provided. Detailed information for the structured implementation of nutritional care for patients with cancer can be found, in the ESPEN guideline and in the German guideline "*Klinische Ernährung in der Onkologie*". Those should become more aware to physicians and should become part of the treatment pathways in clinics and medical practices [24–26].



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#### Conflict of Interest

The authors declare no conflict of interest

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