Barriers to nutritional support in patients with cancer

Report on a project facing malnutrition in a German hospital

Kristina Ludolph, Dagmar Hauner, Volkmar Nüssler, Clemens-Martin Wendtner, Hans Hauner

Abstract

This project sought to improve the nutritional management of cancer patients in a large hematology/oncology inpatient clinic. Patients were screened for the risk of malnutrition using the Nutritional Risk Screening (NRS) questionnaire (2002). In the first part of the project, the "status-quo" was assessed over a period of 8 months. During the second part, patients with an increased risk of malnutrition were offered nutritional therapy. Overall, 63.6% of all recruited patients had an increased risk of malnutrition (NRS ≥ 3). However, only 15 (14.6%) of the 103 patients included in the study consented to dietary therapy during part 2, which mainly consisted of consuming liquid nutritional supplements. The two main treatment barriers identified were inadequate hospital infrastructure to deliver inpatient nutritional management and the general lack of interest from many patients in receiving nutrition support. This project highlights the difficulties of implementing guidelines for nutrition management in the German healthcare system.

Keywords: malnutrition, Nutritional Risk Screening (NRS), nutritional therapy, oncology, tumor patients

Introduction

Malnutrition in cancer patients is widespread and represents a major clinical challenge. The Subjective Global Assessment Questionnaire was used to assess the nutritional status of patients in German hospitals and found that 38% of tumor patients were malnourished [1]. A similarly high prevalence of malnutrition has also been observed in other studies [2]. It is well known that nutritional status, especially in the cancer patient population, is a key determinant of quality of life and a relevant prognostic marker for complication risk and life expectancy [3]. In addition, malnutrition in cancer patients is associated with longer hospital stays and significantly greater medical costs [1, 2, 4].

The problem of malnutrition in the cancer patient population is well known [5, 6] and evidence-based German and European guidelines are available to guide therapy plans [4, 7]. Despite many initiatives from professional and political committees, there has not been substantial progress toward improving care for cancer-related malnutrition, with the ultimate goal of early screening and appropriate therapy in the clinical setting. Although the prevalence of cancer-related malnutrition in the hospital setting is high, few clinics in Germany are staffed with a qualified nutrition team and other infrastructure to provide patients with modern nutritional therapy.

The aim of this study was to determine the frequency of risk of malnutrition in a large hematological/oncological clinic and, using existing resources, to offer patients a nutritional therapy plan that was in line with evidence-based guidelines. A secondary aim was to identify barriers that may prevent appropriate nutritional therapy for patients with malnutrition.

Citation
Ludolph K, Hauner D, Nüssler V, Wendtner C-M, Hauner H: Barriers to nutritional support in patients with cancer. Report on a project facing malnutrition in a German hospital. Ernahrungs Umschau 2020; 67(9): 174–82.
This article is available online:
DOI: 10.4455/eu.2020.035

Peer reviewed
Manuscript (original) submitted: 28 November 2019
Revision accepted: 05 March 2020

Corresponding author
Prof. Dr. Hans Hauner
Institut für Ernährungsmedizin, Klinikum rechts der Isar
Else Kröner-Fresenius-Zentrum für Ernährungsmedizin der TU München
Georg-Brauchle-Ring 62, 80992 München
Hans.hauner@tum.de

Patients and methods

The study took place in a large hematology/oncology department in Munich, Germany. The study protocol was approved by the Faculty of Medicine Ethics Committee, Technical University of Munich (TUM), Germany (protocol number 220/14).

The hematology/oncology department has > 100 patient beds and belongs to a tertiary care hospital in Munich. In total, six dieticians were employed at the 650-bed hospital at the time of the study, of which two worked full time and four worked part-time. The dieticians were mainly responsible for food preparation and service in the hospital kitchen but also provided dietary counseling to inpatients as needed.

The study was divided into two parts. The first part of the study (part 1 – status quo) took place from May to December 2015. Patients were recruited to the study throughout this period and assessed at the time of inclusion for malnutrition using the Nutritional Risk Screening (NRS) 2002 tool [8, 9]. A follow-up assessment took place three weeks later. Any standard dietary therapy that took place during the three weeks of observation, such as nutritional counseling, administration of liquid nutritional supplements or parenteral nutrition were documented under "usual care" conditions.

The second part of the study (part 2 – intervention) took place between January and October 2016. Patients identified as being at risk for malnutrition were offered nutritional therapy according to a stepwise schedule. Patients with an initial NRS score ≥ 3 would receive nutritional counseling by a dietician, and, if necessary, provided further dietary interventions. Patients were reassessed three weeks after the baseline screening (and accompanying nutritional therapy for at-risk patients) to assess the effect of the intervention by comparing results from the baseline assessment to the follow-up assessment.

Patients who were admitted to the hematology/oncology clinic during the recruitment period were informed and invited to participate in the study. In the first three months of the study, only patients with a diagnosis of acute lymphocytic leukemia (ALL) or acute myeloid leukemia (AML) were invited to participate. Of the 229 patients who were eligible to join the study, 173 agreed and 56 refused to participate. The most common reasons for non-participation were physical weakness, non-interest in assessments outside of usual care, protective isolation due to low blood counts, and the subjective assumption by patients that they were not affected by malnutrition. There were no differences in age or gender observed between patients who agreed and refused to participate (data not shown).

Screening for malnutrition and assessment of nutritional status

The NRS questionnaire was used to screen for malnutrition [8]. Individual risk of malnutrition was determined based on questions about BMI, weight loss, food intake, and severity of the disease. If the aggregate score was 3 or greater, an increased risk of malnutrition is present and further diagnostic tests should be carried out. If necessary, nutritional therapy may be initiated [4]. Anthropometric measurements were collected at the time of study inclusion and the follow-up assessment. Patients were weighed in light clothing to the nearest 100 grams with a calibrated scale. Body composition was estimated with a bioimpedance analysis scale (Tanita BC-418 MA single-frequency segment body composition analyzer, Tokyo, Japan). Hand-grip strength from both hands was determined with dynamometry (hydraulic hand force measurement) according to a standard procedure (Jamar hydraulic hand dynamometer, Model 5030J1, Sammons Preston Rolyan, Nottinghamshire, UK).

The NRS questionnaire was performed at study inclusion and repeated three weeks later. The majority of patients who agreed to participate in the study were hospitalized for only a few days to receive chemotherapy treatment and discharged before the follow-up assessment. Patients who were re-admitted to the hospital for another cycle of chemotherapy were assessed as inpatients. Discharged patients were requested to arrive at the hospital three weeks later as an outpatient to complete the second questionnaire. In this way, all patients were able to participate in the baseline and follow-up assessments, regardless of whether they were hospitalized at the time of the second assessment. Around 5% of patients remained hospitalized throughout the three weeks of the study.

The participants' quality of life was assessed with the SF-12 questionnaire (Short Form 12, a questionnaire on health-related quality of life) at study inclusion and repeated three weeks later [10]. Patients were also requested to fill out a plate diagram to record the amount of food consumed after each meal for three weeks. During the follow-up assessment, patients were instructed to fill out a questionnaire to evaluate their attitudes toward food and subjectively rate the hospital food offered in the inpatient unit. The questionnaire also included other aspects such as satisfaction with mealtimes, the temperature and taste of the meals, choice of beverages available and chemosensory changes associated with chemotherapy treatment.

Nutritional therapy intervention

During the intervention part of the study (part 2), nutritional therapy was to be initiated upon assumption or proof of malnutrition. The procedure was based on current guidelines from the German Society for Nutritional Medicine (DGEM) and the European Society for Parenteral and Enteral Nutrition (ESPEN) [4, 7]. The planned stepwise approach included, as the first step, an individual nutri-

tional consultation. Step two consisted of the enrichment of meals or the additional administration of liquid nutritional supplements. If these interventions were insufficient, enteral or parenteral nutrition was initiated [4]. Bodyweight was measured weekly and weight gain or loss was documented during hospitalization.

Statistical Methods

Descriptive statistical analysis was carried out. Mean values with standard deviations are reported for all data with normal distribution. Non-normally distributed data are reported as medians with minimum and maximum values.

Results

A total of 70 patients [44 men (63%) and 26 women (37%)] participated in the Status quo Group (part 1). Mean age was 62 ± 13 years (mean ± SD) and mean BMI was 25.3 ± 3.2 kg/m². The Intervention Group (part 2) was composed of 62 men (60%) and 41 women (40%), with a total of 103 patients. Mean age was 68 ± 12 years. The age distribution was comparable for men and women in both parts of the study. Mean BMI was 25.2 ± 3.5 kg/m². In total, eighteen (10.4%) participants had obesity (BMI ≥ 30 kg/m²) (◆ Table 1). Over 70% of patients in both groups had hematopoietic neoplasms and approx. 25% had gastrointestinal malignancies (◆ Figure 1).

Changes in nutritional status in the Status quo Group (part 1)

Half of the patients in the Status quo Group (n = 35, 17 women and 18 men) achieved an NRS score of ≥ 3 which indicated that they were at an increased risk for malnutrition. After the three week observation period, weight loss was observed in patients regardless of whether they were at higher risk for malnutrition. Notably, weight loss in patients without an elevated risk of malnutrition was higher than in those who were identified as high risk (group comparison, p = 0.001), as shown in ◆ Table 2.

There was a marked decrease in lean body mass, compared to fat mass which generally remained constant. No significant differences were found between the two groups (i.e. those with an NRS score < 3 and ≥ 3). Similar decreases in hand-grip strength were recorded in men and women (◆ Table 2).

	(part 1, n = 70) Status quo Group	(part 2, n = 103) Intervention Group
Sex		
women	26 (37.0 %)	41 (40.0 %)
men	44 (63.0 %)	62 (60.0 %)
Age (years)	62 ± 13	68 ± 12
women	64 ± 16	69 ± 12
men	61 ± 11	67 ± 13
BMI (kg/m²)	25.3 ± 3.2	25.2 ± 3.5
women	23.6 ± 3.1	23.6 ± 3.4
men	26.3 ± 3.2	26.2 ± 3.5

Tab. 1: **Sex, age, and BMI of all study participants (n = 173) with hematological/oncological diseases, categorized by group allocation**
mean ± SD (standard deviation)

Nutritional therapy approaches in the Status quo Group (part 1)

Nutritional therapy was initiated in 8 (11.4%) patients in the Status quo Group (part 1). These patients received liquid nutritional supplements to be taken between meals to meet their daily energy requirements. Patients drank an average of 1½ nutrition supplement drinks per day, which amounted to an additional 300 kcal. Two inpatients (2.9%) received parenteral nutrition that provided 1,500 kcal/day. No patients were given nutritional counseling or received an enriched standard diet.

Changes in nutritional status in the Intervention Group (part 2)

The study aimed to offer evidence-based nutrition management to all Intervention Group patients who had an NRS score ≥ 3, an indication they were at increased risk for malnutrition. In total, 75 of the 103 patients (72.8%), of whom 31 were women and 44 men, were identified as high risk. Both patients with and without an increased risk of malnutrition experienced significant weight loss over the 3-week time-frame. However, those without an increased risk (NRS > 3) lost significantly more weight (-2.9 ± 0.8 vs. -1.9 ± 0.8 kg, p < 0.001) and had a significantly reduced BMI (p = 0.026) compared to those at higher risk (◆ Table 3).

Furthermore, a decrease in lean body mass occurred in patients with and without an increased risk of malnutrition. In contrast, fat mass remained relatively stable in both groups. Hand-grip strength was decreased in men who were at higher risk for malnutrition, while decreased grip-strength in women was comparable in both groups (◆ Table 3).

Nutritional therapy

Nutritional counseling was offered to all patients in the Intervention Group who were at increased risk of malnutrition (n = 75, 72.8%). Notably, 69 of the 75 patients (92.0%) declined. The intended nutritional counseling sessions did not take place with 6 patients (8.0%) because they were discharged before the session could occur.

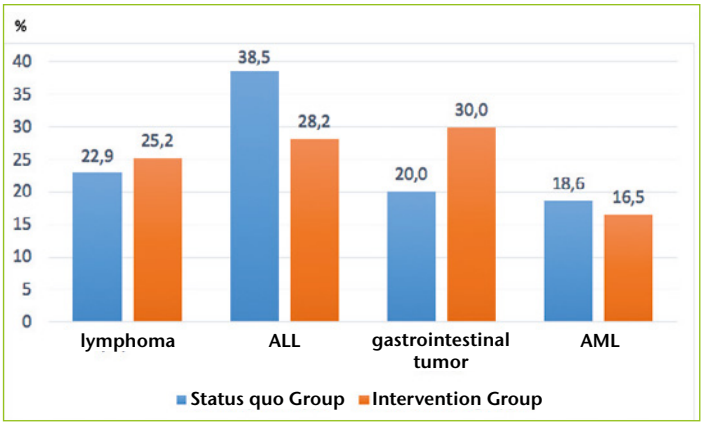

Fig. 1: **Primary diagnosis of patients in both groups (reported as percentages)**
ALL = acute lymphocytic leukemia; AML = acute myeloid leukemia

In total, 15 of the 103 patients with an NRS score ≥ 3 received high-calorie liquid nutrition supplements, which were instructed to be consumed between meals. Patients were requested to drink two to three 200 mL of liquid nutrition supplements per day (300 kcal per drink). When surveyed, patients indicated that they consumed around 1.5 drinks per day.

Five patients with an NRS score ≥ 3 were very weak during their inpatient chemotherapy treatments and were given standard parenteral nutrition (1,500 kcal, standard formula of amino acids, fatty acids and electrolytes) through an implanted port. Patients additionally consumed 1–2 pieces of chopped fruit. Three of the five patients remained hospitalized for the entire 3 week intervention period due to low blood counts or fungal infections. An improvement in nutritional status in these patients was observed at the follow-up assessment, with an average weight gain of around 2–3 kg after three weeks of parenteral nutritional therapy. The other 2 patients who received parenteral nutrition were only treated on the inpatient unit for 4–5 days.

Overall, it was observed that patients who received additional nutritional interventions (i.e. liquid nutrition supplements or parenteral nutrition) over the 3 week intervention period lost less weight than those who did not

	Baseline parameters[a]	Follow-up parameters[b]	Change over time[c]
Body weight (kg)			
NRS ≥ 3 (N = 35)	74 ± 13	73 ± 13	-1 ± 1
NRS < 3 (N = 35)	80 ± 13	78 ± 13	-2 ± 1
			p = 0.001
BMI (kg/m²)			
NRS ≥ 3 (N = 35)	24.7 ± 3.4	24.4 ± 3.1	-0.3 ± 0.5
NRS < 3 (N = 35)	25.9 ± 3	25.3 ± 3	-0.6 ± 0.5
			p = 0.015
Lean body mass (kg)			
NRS ≥ 3 (N = 35)	58 ± 1	57 ± 13	-1 ± 2
NRS <3 (N = 35)	61 ± 10	59 ± 10	-1 ± 2
			p = 0.839
Fat mass (kg)			
NRS ≥ 3 (N = 35)	17 ± 7	17 ± 6	-0.1 ± 2
NRS < 3 (N = 35)	19 ± 5	18 ± 5	-1 ± 2
			p = 0.226
Right hand-grip strength (kg) NRS ≥ 3			
women (N = 17)	19 ± 9	17 ± 4	-2 ± 5
men (N = 18)	30 ± 9	29 ± 9	-1 ± 4
Right hand-grip strength (kg) NRS < 3			
women (N = 9)	23 ± 9	20 ± 6	-3 ± 4
men (N = 26)	35 ± 9	33 ± 6	-2 ± 5
			p = 0.891

Tab. 2: **Anthropometric changes in the Status quo Group (part 1) at baseline and follow-up assessment 3 weeks later, categorized by malnutrition risk according to the NRS score**
P-values relate to differences between participants with (NRS ≥ 3) and without (NRS > 3) risk of malnutrition.
[a] Baseline values were measured at the time of study inclusion.
[b] Follow-up parameters were measured 3 weeks after baseline measurements.
[c] Change over time refers to the difference between baseline and follow-up parameters.
NRS = Nutritional Risk Screening 2002

	Baseline aprameters[a]	Follow-up parameters[b]	Change over time[c]
Body weight (kg)			
NRS ≥ 3 (N = 75)	74 ± 14	72 ± 13	-2 ± 1
NRS < 3 (N = 28)	79 ± 14	76 ± 13	-3 ± 1
			p < 0.001
BMI (kg/m²)			
NRS ≥ 3 (N = 75)	24.8 ± 3.5	24.2 ± 3	-0.8 ± 1
NRS < 3 (N = 28)	26.1 ± 3.6	25.1 ± 3.4	-1.0 ± 0.8
			p = 0.026
Lean body mass (kg)			
NRS ≥ 3 (N = 75)	57 ± 12	55 ± 11	-2 ± 3
NRS < 3 (N = 28)	60 ± 1	57 ± 13	-2 ± 3
			p = 0.881
Fatt mass (kg)			
NRS ≥ 3 (N = 75)	17 ± 6	17 ± 5	0.1 ± 2
NRS < 3 (N = 28)	19 ± 6	18 ± 5	-1 ± 2
			p = 0.164
Right hand-grip strength (kg) NRS ≥ 3			
women (N = 31)	18 ± 9	16 ± 6	-2 ± 3
men (N = 44)	28 ± 9	26 ± 7	-2 ± 2
Right hand-grip strength (kg) NRS < 3			
women (N = 10)	23 ± 9	22 ± 4	-1 ± 5
men (N = 18)	33 ± 9	31 ± 10	-1 ± 5
			p = 0.335

Tab. 3: **Anthropometric changes in the Intervention Group (part 2) at baseline and 3 weeks later, categorized by malnutrition risk according to the NRS score**
P-values relate to differences between participants with (NRS ≥ 3) and without (NRS > 3) risk of malnutrition.
[a] Baseline values were measured at the time of study inclusion.
[b] Follow-up parameters were measured 3 weeks after baseline.
[c] Change over time refers to the difference between baseline and follow-up parameters.
NRS = Nutritional Risk Screening 2002

have additional nutritional support. Mean baseline weight for patients receiving nutritional therapy was 57.9 ± 6.3 kg and 57.3 ± 6.5 kg at the follow-up assessment (p = 0.799). Comparatively, mean baseline weight for patients without therapy was 77.8 ± 13.7 kg, and 75.0 ± 13.4 kg at follow-up (p < 0.001).

A decrease in lean body mass was observed in patients who did not receive a nutritional intervention, while fat mass remained relatively stable. Hand-grip strength decreased over the three week period (◆ Table 3). Patients who were hospitalized for the entire intervention period had a worse ratio of fat mass/lean body mass than those who completed the follow-up assessment as outpatients (data not shown).

Quality of life

◆ Table 4 shows that the SF-12 questionnaire for subjective health-related quality of life indicated a decrease in physical health scores in all groups after three weeks (i.e., Status quo and Intervention Groups as well as those with and without nutritional interventions). Mental health scores in the Status quo Group were significantly different between patients with and without a malnutrition risk at the 3-week follow-up assessment (p = 0.028). Patients without a nutritional risk initially had a higher physical health score than patients with a malnutrition risk but reported a sharper decrease in their quality of life at follow-up compared to those at risk of malnutrition. Mental health scores in the intervention group were comparable in the 3-week follow-up assessment between patients with and without a malnutrition risk.

Participant surveys

Hospital meals received comparably negative ratings from patients with and without malnutrition risk. The main criticisms were that lunch was often not hot enough and dinner was bland and served too early. Some, but not a majority, of patients also complained that they experienced several chemosensory changes that resulted in a loss of appetite, nausea, and changes in taste. Side effects were often severe and occurred during or shortly after chemotherapy sessions, which resulted in patients being unable to tolerate food and consuming very little.

	Baseline paramters[a]	Follow-up paramters[b]	Change over time[c]
Status quo Group (N = 35)			
NRS ≥ 3			
physical health	43 ± 6	49 ± 3	-4 ± 6
mental health	40 ± 4	39 ± 4	-1 ± 5
Status quo Group (N = 35)			
NRS < 3			
physical health	43 ± 5	40 ± 3	-2 ± 5 **p = 0.254**
mental health	42 ± 4	38 ± 5	-4 ± 5 **p = 0.028**
Intervention Group (N = 75)			
NRS ≥ 3			
physical health	43 ± 5	39 ± 3	-3 ± 6
mental health	46 ± 5	40 ± 3	-6 ± 5
Intervention Group (N=28)			
NRS < 3			
physical health	43 ± 5	39 ± 3	-4 ± 7 **p = 0.760**
mental health	45 ± 4	39 ± 4	-5 ± 4 **p = 0.487**

Tab. 4: **Evaluation of the SF-12 questionnaire from the Status quo and Intervention Group according to the NRS scores**
Mean values ± SD. Scores on the SF-12 range from 0 to 100 with a higher score indicating better physical and mental health. P-values relate to differences between participants with (NRS ≥ 3) and without (NRS > 3) risk of malnutrition.
[a] Baseline parameters were measured at the time of study inclusion.
[b] Follow-up parameters were measured 3 weeks after baseline.
[c] Change over time refers to the difference between baseline and follow-up parameters.
NRS = Nutritional Risk Screening 2002

In total, 69 of the 75 patients at risk for malnutrition declined a nutritional intervention. Reasons for refusal are listed in ◆ Table 5. Many patients indicated that they wanted to finish their chemotherapy sessions and return home as soon as possible so that they could return to their usual eating habits. Moreover, they reported that they would only consume food that their relatives brought from home during their hospital stay.

Several patients felt overwhelmed by their cancer diagnosis and were unsure of what to expect. They preferred to wait until they had tolerated chemotherapy before starting an intervention. Others reported that nutrition counseling could not change the poor quality of hospital food that was available. Notably, many patients indicated that they would like to eat healthier in the future, but that implementing these goals was not feasible as an inpatient. ◆ Table 5 shows that most patients gave 3–4 reasons for refusing nutrition counseling. Seven patients from the Status quo Group (10%) and 11 patients in the Intervention Group (10.7%), representing 10.4% of all participants, viewed weight loss as a positive side effect of chemotherapy. They recounted that they had tried and failed at dieting in the past and were pleased with their weight loss.

Discussion

The results of this study showed that almost two-thirds of study participants with hematological or gastroenterological tumors were at increased risk for malnutrition. A likely reason that explains the high prevalence rate is the NRS scoring method. Patients with hematological tumors are automatically given a score of 2. Consequently, achieving an elevated nutritional risk score (NRS ≥ 3) points is highly probable.

Part 1 of the study demonstrated that study participants experienced significant weight loss after inpatient admission and chemotherapy treatment independent of nutritional status. Weight loss was largely due to decreased lean body mass with little change in fat mass. Similar weight changes, including reduced lean body mass, were observed in part 2 of the study, during which evidence-based nutritional management approaches were applied. Decreased hand-grip strength was documented in both groups, an important consideration given that muscle wasting and loss of strength related to sarcopenia is prognostically unfavorable in tumor diseases. It is also known that a diagnosis of sarcopenia results in a poorer response to chemotherapy and should be prevented [11].

The primary goal of the study was to improve the nutritional management in tumor patients with an increased risk of malnutrition. Only 11.4% of patients in the Status quo Group (part 1), received nutritional therapy under "usual care" conditions, even though 50% had an NRS score ≥ 3, which flagged them as nutritionally at-risk patients. During the intervention part of the study (part 2), nutrition management was offered to all patients with an elevated risk of malnutrition. Unfortunately, only 14.6% of the patients consented to treatment. Nutritional therapy in both parts 1 and 2 was most often delivered in the

Reason for refusing nutritional advice	Number of responses (main answer given, n = 69)	Number of responses (one of several answers given)
food is healthier and tastes better at home	17 (24.6 %)	45 (65.2 %)
prefer to wait until treatment has progressed	14 (20.3 %)	19 (27.5 %)
will only be in the hospital for a few days for chemotherapy	12 (17.4 %)	54 (78.3 %)
pleased with weight loss	11 (15.9 %)	11 (15.9 %)
not interested	4 (5.8 %)	9 (13.0 %)
nutritional advice will not improve the quality of hospital food	3 (4.3 %)	18 (26.1 %)
relatives bring food from home according to the patient's personal preferences	2 (2.9 %)	36 (52.2 %)
other reasons	6 (8.7 %)	3 (4.3 %)

Tab. 5: **Reasons given by Intervention Group patients who did not consent to nutritional counseling (n = 69)**

form of liquid nutritional supplements that were intended to be consumed between meals.

The study intention of offering nutrition counseling by dieticians as the first step in the stepwise approach was unfortunately not realized. An important barrier to implementation was that the dieticians were mainly responsible for preparing daily meals in the hospital kitchen and were largely unavailable. More concerning is that almost all patients with elevated nutritional risk refused nutritional counseling, citing various reasons for refusal (◆ Table 5). The main problem was that many patients were not convinced that chemotherapy-associated weight loss could be avoided and that sufficient energy intake should be maintained.

Many patients were focused on their chemotherapy treatments, but also seemed to be overwhelmed with their cancer diagnosis. They expected little benefit from the nutritional interventions that were offered and preferred instead to see if they were able to tolerate the chemotherapy. Patients rated the quality of hospital food very poorly and complained that hospital menus were not sensitive to chemosensory changes that commonly occur during or after treatment. It is also remarkable that patients did not subjectively perceive their weight loss as threatening. This was particularly the case among male patients with obesity, who considered weight loss during chemotherapy to be a positive outcome since previous attempts to reduce their body weight were unsuccessful. Accordingly, these patients consistently refused nutrition counseling.

Many patients seemed to fundamentally underestimate the problem and did not consider nutrition management to be the responsibility of hospital staff. Rather, they expected that they would be able to quickly regain any weight they had lost after returning home. The follow-up survey revealed that hospital food had limited options and did not correspond to patients' normal eating habits and preferences, which largely accounted for poor energy intake. Thus, there is certainly the potential to improve hospital food quality and promote an adequate supply of energy. Patients also should not expect that they will compensate for chemotherapy-associated muscle loss once they return home, particularly because most will not receive outpatient nutrition management [11].

These findings clearly show a knowledge gap among hematology/oncology patients regarding the impact of diet on the course of their disease. It was equally evident that nutritional therapy does not play a role in the clinical management of the patient. Doctors and nurses paid little attention to the nutrition status of their patients and only reacted when significant weight loss was experienced. Even then, common treatments were prescriptions for liquid nutrition supplements or initiating parenteral nutrition. Most hospital stays are not long enough to substantially improve a patient's nutrition status. It is also questionable if the outpatient physician will recognize the existing nutritional deficits and incorporate nutrition management in the treatment plan. New ways of collaboration between hospital and outpatient physicians can ensure the continuity of care and help close the treatment gap.

Contrary to evidence-based guidelines, a simple malnutrition screening tool is not routinely utilized, nor are patients with an increased risk of malnutrition offered nutrition counseling [4, 7]. Routine screening of all cancer patients for malnutrition risk upon admission, informing patients of the impact of nutrition on their overall disease prognosis, and integrating nutrition counseling into the inpatient care plan is therefore strongly advised.

Findings described herein are not unusual and most likely represent the typical situation in German inpatient clinics for tumor patients at risk for malnutrition. Indeed, most inpatient centers do not routinely screen for malnutrition. Physicians and nurses in our study were generally unaware of the importance of nutritional management as part of patient therapy,

although after presenting the topic they demonstrated a willingness to increase their attention and sensitivity to nutrition status. However, considerable barriers to dedicating more attention to nutrition exist, including time pressure, lack of personnel, and prioritizing other medical complications, which are often acute and frequently arise when caring for critically ill patients. Nutritional management of patients with malnutrition is met with several barriers that are largely due to inadequate infrastructural elements, such as staff shortages, knowledge deficits among medical and healthcare staff, and overworked dieticians. Evidence-based nutrition guidelines cannot be implemented in a clinical setting that lacks qualified dieticians with the time and resources to manage the nutritional needs of their patients.

Inadequate nutrition management has also been observed in outpatient settings. A recent analysis of oncology practices found that screening for malnutrition or incorporating nutrition management in the treatment plan rarely occurs [12].

A further important point is that seriously ill oncology patients strongly rely on family and social support. This shift in perspective should also be taken into account when delivering nutrition management, meaning that not only the patients but also their families should be informed and on-board with the treatment plan. Moreover, outpatient physicians and nutritionists can engage with hospital staff to promote a seamless transition to outpatient services and improved continuity of care. Regrettably, the topic of nutrition has thus far received little attention in the outpatient oncology setting [12].

In conclusion, this study clearly demonstrates that the infrastructural systems needed to implement modern nutrition management in patients with malnutrition are largely missing. Moreover, there is a lack of awareness of the topic, both among the medical staff and their patients who are affected by malnutrition. A nutrition management plan is especially critical for tumor patients who are undergoing chemotherapy since nutritional status plays an essential role in improved quality of life and is an important determinant of disease prognosis.

In this context, it is also essential to promote awareness among cancer patients of the importance of nutrition, not only on the course of their disease but also on their subjective well-being.

Acknowledgments

We would like to thank the employees of the Munich Clinic Schwabing, especially the dietitians and Ms. Silvia Bianco for their tremendous support in carrying out this project. Our thanks also extend to Ms. Christine Leicht, dietitian, and Dr. Lynne Stecher, statistician, for helping with the preparation and evaluation of the project. We would also like to thank the Tumor Center Munich for financial support.

Dr. med. Kristina Ludolph[1]
Dr. Dagmar Hauner[1]
Prof. Dr. Volkmar Nüssler[2]
Prof. Dr. Clemens-Martin Wendtner[3]
Prof. Dr. Hans Hauner[1, 4]

[1] Institut für Ernährungsmedizin, Klinikum rechts der Isar, Else Kröner-Fresenius-Zentrum für Ernährungsmedizin der TU München
Georg-Brauchle-Ring 62, 80992 München

[2] Tumorzentrum München, Ludwig-Maximilians-Universität München

[3] München Klinik Schwabing, Klinik für Hämatologie, Onkologie, Immunologie, Palliativmedizin, Infektiologie und Tropenmedizin

[4] Hans.hauner@tum.de

Conflict of Interest

Prof. Hans Hauner has received consulting fees from Danone, Nestlé, and MedScape for the past 3 years and has also received a lecture fee from Rettenmeyer & Sons. The other authors declare no conflict of interest.

References

1. Pirlich M, Schutz T, Norman K et al.: The German hospital malnutrition study. Clin Nutr 2006; 25: 563–72.
2. Löser C: Malnutrition in hospital: the clinical and economic implications. Deutsches Ärzteblatt International 2010; 107: 911–7.
3. Norman K, Pichard C, Lochs H, Pirlich M: Prognostic impact of disease-related malnutrition. Clin Nutr 2008; 27: 5–15.
4. Arends J, Bertz JH, Bischoff SC et al.: S3-Leitline der Deutschen Gesellschaft für Ernährungsmedizin e. V. Klinische Ernährung in der Onkologie. Aktuelle Ernährungsmed 2015; 40: 1–74.
5. Sorensen J, Kondrup J, Prokopowicz J et al.: EuroOOPS: An international, multicentre study to implement nutritional risk screening and evaluate clinical outcome. Clin Nutr 2008; 27: 340–9.
6. Barker LA, Gout BS, Crowe TC: Hospital malnutrition: prevalence, identification and impact on patients and the healthcare system. Int J Environ Res Public Health 2011; 8: 514–27.
7. Arends J, Bachmann P, Baracos V et al.: ESPEN guidelines on nutrition in cancer patients. Clin Nutr 2017; 36: 11–48.
8. Kondrup J, Rasmussen HH, Hamberg O et al.: Nutritional risk screening (NRS 2002): A new method based on an analysis of controlled clinical trials. Clin Nutr 2003; 22: 321–36.
9. Kondrup J, Allison SP, Elia M et al.: ESPEN Guidelines for nutrition screening 2002. Clin Nutr 2003; 22: 415–21.
10. Bullinger M, Kirchberger I: SF-36 Fragebogen zum Gesundheitszustand. Göttingen: Hogrefe-Verlag 1998.
11. Bozzetti F: Forcing the vicious cycle: sarcopenia increases toxicitiy, decreases response to chemotherapy and worsens with chemotherapy. Ann Oncol 2017; 28(9): 2107–18.
12. Hauner H, Kocsis A, Jaeckel B et al.: Häufigkeit eines Risikos für Mangelernährung in onkologischen Schwerpunktpraxen – eine Querschnittserhebung. Dtsch Med Wochenschr 2020; 145(1): e1–9.

DOI: 10.4455/eu.2020.035