

Nutrition in Cancer Care: A Brief, Practical Guide With a Focus on Clinical Practice

Gabor Liposits, MD^{1,2,3}; Ylva Orrevall, PhD^{4,5}; Stein Kaasa, PhD^{6,7}; Pia Österlund, PhD^{8,9}; and Tommy Cederholm, PhD^{10,11}

QUESTION ASKED: Are patients with cancer receiving appropriate nutritional screening, assessment, and interventions?

SUMMARY ANSWER: Nutrition plays a crucial role for patients with cancer; however, nutritional problems are often underprioritized, underdiagnosed, and undertreated, thereby affecting treatment outcomes and quality of life. The authors provide an evidence-based guidance focusing exclusively on the practical aspects of nutrition in oncology, which will hopefully help healthcare professionals improve patient care (Fig).

WHAT WE DID: We summarized the clinical aspects of the available evidence-based guidelines and turned them into a practical approach that may be used by healthcare professionals.

WHAT WE FOUND: If healthcare providers are aware of nutritional issues, the prevention, delay, treatment, or even reversal of sarcopenia may be feasible.

REAL-LIFE IMPLICATIONS: Prevention, early identification of patients at risk, accurate diagnosis, personalized intervention, and follow-up are cornerstones of the management of malnutrition and its consequences: sarcopenia and cachexia.

CORRESPONDING AUTHOR

Gabor Liposits, MD, Department of Oncology, Odense University Hospital, J.B. Winsløvs Vej 4., 5000 Odense C, Denmark; Department of Clinical Research, University of Southern Denmark, J.B. Winsløvs Vej 19.3, 5000 Odense C, Denmark; Academy of Geriatric Cancer Research (AgeCare), Odense University Hospital, Odense, Denmark; e-mail: Gabor.Istvan.Liposits@rsyd.dk.

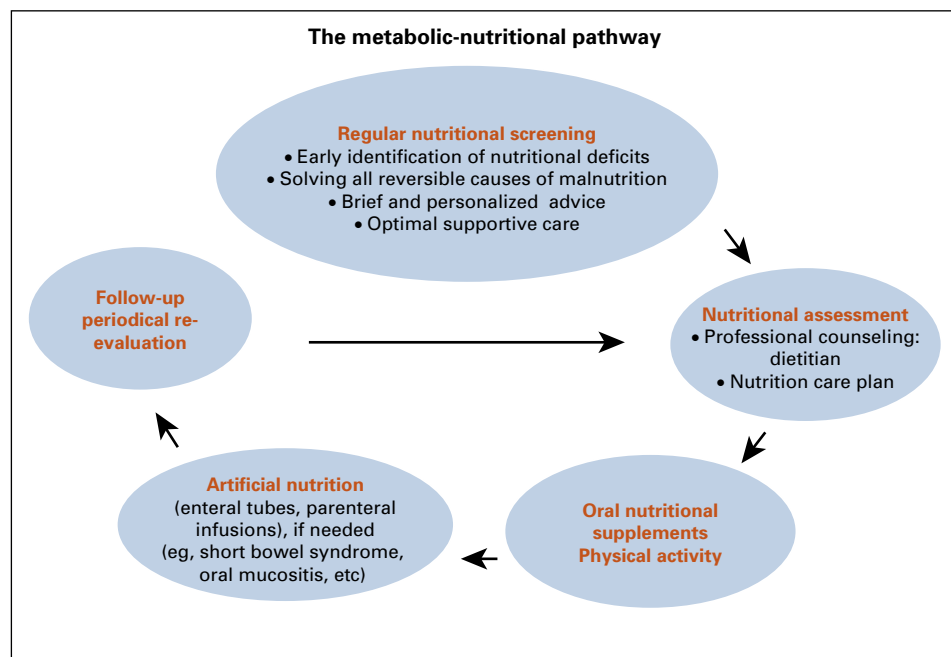


FIG. Nutrition screening and the nutrition care process.

ASSOCIATED CONTENT

Data Supplement

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abstract

This overview aims to create an understanding of the nutritional issues concerning patients with cancer and provide evidence-based practical guidance to healthcare professionals (physicians, nurses, and dietitians), caregivers, and all others involved in the care of patients with cancer. The focus of this paper is therefore on providing a simple guide for daily clinical practice. The theoretical background and in-depth comprehensive reviews of malnutrition are described elsewhere. Nutrition plays a crucial role in cancer care. It affects treatment tolerability, outcomes, and quality of life. However, a focus on nutrition is still lacking among oncologists because of insufficient training in nutrition topics received during graduate and postgraduate training and an underestimation of its importance. The consequences of the disease and its treatment, such as anorexia-sarcopenia-cachexia, are therefore still often overlooked, underdiagnosed, and undertreated. The authors have summarized the most important challenges, evidence-based recommendations, and common clinical scenarios to bridge the gap between comprehensive guidelines and clinical practice, where brief concrete advice is preferred to systematic reviews. Furthermore, an easy applicable overview is provided, which can be used as a guide during daily routines.

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INTRODUCTION

Malignant disorders are one of the leading causes of morbidity and mortality worldwide.¹⁻³ The incidence and prevalence of cancer cases are expected to increase in the coming decades along with the aging of the population.¹⁻³

Major improvements in cancer treatment (surgery, systematic treatment, radiotherapy) have been achieved over the past 20 years because of multimodal therapies, resulting in improved rates of cure and prolonged survival in the palliative setting.^{3,4} Based on the facts mentioned above, it is anticipated that healthcare systems worldwide will face a significant increase in the number of patients, especially older patients. The tolerability and outcome of a multimodal treatment approach depends on many factors, one of the most important of which is nutrition,^{5,6} regardless of whether the course of treatment for the patient is curative or palliative. Therefore, the acquisition of appropriate competencies in clinical nutrition and a multidisciplinary team approach are essential in order that all physicians and healthcare professionals can provide optimal nutrition as an integrated part of cancer treatment.

Identifying and Understanding the Nutritional Issues in Patients with Malignant Diseases: A Challenge

There is still a lack of focus on nutrition among physicians⁷ and healthcare professionals because of the underestimation of its importance and insufficient training in nutrition topics being given during graduate and postgraduate training. A survey among oncologists showed⁷ that most oncologists lack an awareness of, and do not understand, the consequences of cancer-associated weight loss.

Although the diagnostic criteria of malnutrition may differ depending on the tool that is used, the prevalence of malnutrition was reported in several surveys as being up to 50% among hospitalized patients with cancer.^{3,8-11} Furthermore, the severity of weight loss is an independent predictive factor for shorter overall survival⁵; about 10%-20% of all cancer mortality is directly related to malnutrition rather than to the underlying cancer.^{6,8} However, data show that appropriate nutrition through the use of comprehensive intervention may lead to improved treatment outcomes, although evidence from randomized clinical

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trials remains scarce.¹²⁻¹⁵ Prevention, early identification of patients at risk, accurate diagnosis, personalized intervention, and follow-up are cornerstones of the management of malnutrition and its consequences: sarcopenia and cachexia.⁶

Sarcopenia and Cancer-Associated Cachexia and Anorexia Syndrome

Loss of skeletal muscle mass and function is a physiological process; it is a part of normal musculoskeletal aging that begins already in the fourth decade of life.¹⁶⁻²⁰ Aging, genetic and lifestyle factors, chronic diseases (eg, cancer, chronic obstructive pulmonary disease, chronic heart failure, infectious diseases), and even acute conditions may accelerate sarcopenia (Table 1). The ensuing results are impairment in activities of daily living,²¹ loss of independence,^{22,23} mobility disorders and increased risk of falls and fractures,^{24,25} cognitive impairment,²⁶ lower quality of life,²⁷ increased risk of chemotherapy toxicities²⁸ and mortality,²⁹ and longer hospital admissions and higher hospital costs.³⁰

Patients with cancer are at significant risk of developing cancer-associated cachexia and anorexia syndrome (CACS).³¹⁻³³ CACS is a multifactorial condition characterized

by ongoing loss of skeletal muscle and/or fat that cannot be fully reversed by conventional nutritional support and which leads to progressive functional impairment.³¹⁻³³ Sarcopenia and CACS are overlapping conditions that are often overlooked, underdiagnosed, and undertreated in clinical practice.^{16,31,32} However, the prevention, delay, treatment, or even reversal of sarcopenia are feasible.^{16,33,34} A multicenter study showed that 43% of hospitalized patients did not receive any nutritional support despite being diagnosed with malnutrition, and almost 40% of all hospitalized patients were malnourished.⁹ Early detection and treatment of malnutrition and its consequences are crucial for patients with cancer to maintain their physical function, mental well-being, and quality of life.

Patients at Particular Risk: Obese Patients and Older Patients With Cancer

Sarcopenic obesity has an evolving significance in clinical practice because of the ongoing global obesity epidemic.^{5,34,35} Obese patients developing sarcopenia are at higher risk of being overlooked because they have a high body mass index and the loss of skeletal muscle is not obvious. Sarcopenic obesity warrants special awareness by the clinical team.^{5,34,35}

TABLE 1. Physiological Changes Related to Aging, Cancer, and Treatment-Related Symptoms/Side Effects, and Their Impact and Consequences on Nutrition in Patients With Cancer

Physiological Changes Related to Aging	Disease and Treatment-Related Symptoms and Side Effects	Social/Psychological/Spiritual Impacts and Consequences
Sensory impairments Decreased sense of taste Decreased sense of smell Decreased sense of thirst	Chemotherapy and radiotherapy of the head and neck regions Altered sense of taste Xerostomia Mucositis Pain Nausea/vomiting	Limited access to food Decreased ability to purchase and prepare food Decreased appetite Difficulty chewing Poor diet Lacking essential nutrients
GI changes Delayed/slower gastric and bowel motility	Dyspepsia: gastric/duodenal ulcer/reflux esophagitis Decreased level of gastric acid: eg, alcoholism Constipation/ileus: serotonin antagonists, opiates Diverticulosis/diverticulitis Chemotherapy: colitis-ileitis, diarrhea, malabsorption Medications: antibiotics, antidepressants, dopamine antagonists	Inflammation Malnutrition Lack of interaction with others at mealtimes Social isolation—loneliness Family conflicts Depression Anxiety
Oral health/dental problems	Chemotherapy and radiotherapy of the head and neck regions Altered sense of taste Xerostomia Mucositis Pain Nausea or vomiting	Stress Economic issues Impaired IADL Impaired ADL Decreased mobility CACS
Decreased physical activity	Fatigue caused by cancer and/or treatment Arthrosis Obesity Osteopenia Dementia Sarcopenia	Sarcopenia
Sarcopenia Decreased lean body mass	Decreased physical activity Cancer cachexia and anorexia syndrome Chronic nonmalignant conditions: COPD, CHF, ESRD Dementia/neurologic disorders	

Abbreviations: ADL, activities of daily living; CACS, cachexia and anorexia syndrome; CHF, chronic heart failure; COPD, chronic obstructive pulmonary disease; ESRD, end-stage renal disease; IADL, instrumental activities of daily living.

The geriatric population, especially older patients with cancer, are at increased risk of developing sarcopenia or even the acceleration of pre-existing sarcopenia leading to increased vulnerability; this is called the frailty syndrome.¹⁶⁻²⁰ Screening for nutritional problems, assessing muscle mass or function, and guided interventions related to nutrition and physical performance are therefore crucial in older patients with cancer who have been treated with surgery, systemic treatment, or radiotherapy. This comprehensive approach—including both assessment and intervention—is called comprehensive geriatric assessment and its use is highly encouraged by leading cancer societies, for example, the International Society of Geriatric Oncology and the ASCO.³⁶⁻³⁸

PRACTICAL NUTRITION GUIDANCE: METHODOLOGY

To address cancer-related malnutrition and provide a brief simple approach to tackling this important and complex issue in daily clinical practice, a Nordic expert panel has prepared an easily applicable practical guide (Data Supplement, online only) based on the European Society for Clinical Nutrition and Metabolism guidelines⁶ and the Global Leadership Initiative on Malnutrition (GLIM) criteria.³⁹

The multiprofessional Nordic expert panel consisted of a dietitian and a clinical nutritionist (a geriatrician) from Sweden, two clinical oncologists from Finland and Denmark, and a palliative care specialist from Norway. One in-person meeting and a video conference were held between April and October 2019 followed by email communication to discuss the available evidence in the field and prepare the expert opinion document.

CONTINUUM OF CARE IN NUTRITION

Diagnostic Workup

When the suspicion of malignancy arises, the patient must undergo diagnostic and staging workup, after which the multidisciplinary tumor board suggests a therapeutic plan for the patient consisting of different treatment modalities and periodic evaluation ensuring the continuum of care in oncology.³ The same process—screening or assessment, intervention, and periodic evaluation—the so-called nutrition care process (Fig 1), should ensure appropriate nutrition and be offered to patients in parallel with the cancer care.³ The multidisciplinary tumor board should generally include dietitians and clinical nutritionists as is the routine in many teams caring for patients with upper GI and head and neck cancers. The concept that nutrition is an essential part of the cancer treatment, and not an additional add-on service, needs to be widely disseminated among health-care professionals taking care of patients with cancer that originates from all anatomical sites.

The Diagnosis of Malnutrition According to the GLIM

The considerable work of the GLIM working group has resulted in a global consensus concerning the definition of the criteria for the diagnosis of malnutrition in the clinical setting.³⁷ The GLIM criteria involve a two-step approach.

Step 1 is to identify patients at risk using a validated screening tool (eg, NRS-2002, MNA-SF, MUST, etc). If the patient has a risk of weight loss or malnutrition, then screening should be repeated periodically. Although there is no evidence from randomized clinical trials showing

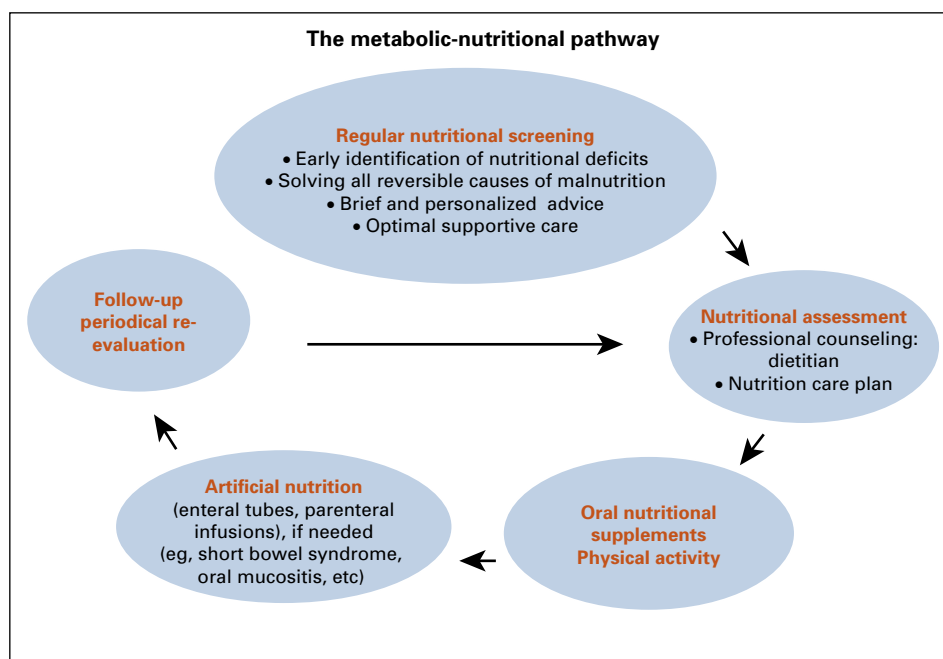


FIG 1. Nutrition screening and the nutrition care process.

the benefit of regular nutritional screening in heterogeneous cancer populations,⁶ there are some high-risk cancer sites (head and neck, upper GI) where close monitoring (eg, weekly) of the patient's nutritional status is essential. Other cancer sites where the risk of developing weight loss is lower should be screened on a more individual basis according to the clinical situation,⁴⁰ for example, with clinical deterioration because of disease progression and/or toxicities. From a more practical perspective, every patient with cancer should be screened, at least, at diagnosis of cancer, on hospital admission, on clinical deterioration, and when reporting weight loss while receiving systemic treatment, radiotherapy, or surgery.

Step 2 for patients at risk is to assess for confirmation of the diagnosis of malnutrition and determine severity grading. As described in the Data Supplement, the diagnosis of malnutrition according to GLIM requires the combination of at least one phenotypic criterion: weight loss, underweight, or low muscle mass, with at least one etiologic criterion: reduced food intake or malabsorption or high disease burden or inflammation. The International Classification of Diseases and Related Health Problems version 10 (ICD10) codes for malnutrition (ICD10: E40-E46) and sarcopenia and cachexia (ICD10: R63.4 and R64) must be registered in the electronic patient record.

The result of these assessments will guide the interventions and nutritional counseling with a dietitian is therefore crucial in this process.

The plans for nutrition care and intervention demand close cooperation with the treating physician and caregivers, and should also consider patient preferences. The results of interventions should be regularly monitored and reassessed at adequate intervals (eg, weekly, fortnightly, three-monthly) depending on the patient's nutritional risk and clinical situation.⁶

Responsibility: The Role of the Key Person

It must be remembered that everyone's responsibility is nobody's responsibility. This is why every unit treating patients with cancer must appoint a key person who is responsible for nutrition. This person should be engaged in nutritional issues and should have an in-depth understanding of clinical nutrition.

CLINICAL SCENARIOS INFLUENCING THE AIM AND INTENTION OF THE NUTRITIONAL TREATMENT

Curative Treatment and Life-Prolonging Palliative Treatment

Patients receiving antineoplastic treatment and whose GI function is intact should receive individualized nutritional

counseling by a registered nutritionist and dietitian concerning energy and protein needs, lifestyle, eating habits, and personal preferences that should be individualized by stage of the disease and treatment goal.⁶ Appropriate supportive care during the treatment course is essential; all reversible symptoms such as nausea or vomiting, stomatitis, diarrhea, pain, depression, oral or esophageal fungal infection that affect nutrition should be addressed and alleviated. The patient and caregivers must understand the importance of the intervention and should be actively involved in the decision-making process, with higher motivation and increased adherence to the treatment plan and recommendations.⁶

Radiotherapy of the head and neck, upper GI tumors, and thoracic malignancies may result in numerous adverse effects (eg, xerostomia, mucositis, swallowing difficulties, pain); enteral feeding using nasogastric or percutaneous tubes is recommended in such cases. If oral or enteral feeding is not possible, parenteral nutrition may be an option in highly selected cases.

The nutritional targets are as follows: energy 25-30 kcal/kg/d and protein 1-1.5 g/kg/d.⁶

Palliative Treatment for Symptom Relief

The purpose of the treatment in this situation is improvement of quality of life rather than prolonging survival; more attention should therefore be given to patient preferences. Treatment options, expected benefit of the treatment, and toxicity issues should be discussed with the patient and caregivers. Individual nutritional counseling and adequate supportive care may contribute to increased quality of life and satisfaction among patients and caregivers.

End-of-Life Care

For patients who are dying, the goal is maximum comfort. Enteral and parenteral nutrition do not provide benefits.⁶ Short and limited hydration may be recommended to avoid delirium or confusion.

In conclusion, nutrition plays a crucial role for patients with cancer; however, nutritional problems are often underprioritized, underdiagnosed, and undertreated, thereby affecting treatment outcomes and quality of life. This brief evidence-based guidance focusing exclusively on the practical aspects of the daily routine in oncology will hopefully help healthcare professionals improve patient care.

The Data Supplement can be used as a pocket guide making it easy to refer to and apply during consultations.

AFFILIATIONS

¹Department of Oncology, Odense University Hospital, Odense, Denmark

²Department of Clinical Research, University of Southern Denmark, Odense, Denmark

³Academy of Geriatric Cancer Research (AgeCare), Odense University Hospital, Odense, Denmark

⁴Department of Clinical Nutrition, Karolinska University Hospital, Stockholm, Sweden

⁵Department of Biosciences and Nutrition, Karolinska Institute, Stockholm, Sweden

⁶Department of Oncology, Oslo University Hospital, Oslo, Norway

⁷Institute of Clinical Medicine, University of Oslo, Oslo, Norway

⁸Department of Oncology, Tampere University Hospital, Tampere, Finland

⁹University of Tampere, Tampere, Finland

¹⁰Clinical Nutrition and Metabolism, Department of Public Health and Caring Sciences, Uppsala University, Sweden

¹¹Theme Ageing, Karolinska University Hospital, Stockholm, Sweden

Clinical Research, University of Southern Denmark, J.B. Winsløvs Vej 19.3, 5000 Odense C, Denmark; Academy of Geriatric Cancer Research (AgeCare), Odense University Hospital, Odense, Denmark; e-mail: Gabor.Istvan.Liposits@rsyd.dk.

AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

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AUTHOR CONTRIBUTIONS

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Data analysis and interpretation: All authors

Manuscript writing: All authors

Final approval of manuscript: All authors

Accountable for all aspects of the work: All authors

CORRESPONDING AUTHOR

Gabor Liposits, MD, Department of Oncology, Odense University Hospital, J.B. Winsløvs Vej 4., 5000 Odense C, Denmark; Department of

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AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST**Nutrition in Cancer Care: A Brief, Practical Guide With a Focus on Clinical Practice**

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Gabor Liposits

Honoraria: Nutricia AS

Travel, Accommodations, Expenses: Nutricia AS

Ylva Orrevall

Consulting or Advisory Role: Nutricia

Stein Kaasa

Honoraria: Nutricia, Fresenius Kabi

Research Funding: Nutricia

Pia Österlund

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Travel, Accommodations, Expenses: Abbvie, Roche, Merck, AstraZeneca

Tommy Cederholm

Honoraria: Nutricia, Nestle

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