

EDITORIAL

THE COMPLEX REALITY OF MALNUTRITION MANAGEMENT IN ONCOLOGY

Valentina Da Prat^{1,*}, Amanda Casirati¹, Elisa Colombo¹, Giorgia Preziati¹, Lorenzo Perrone², Francesco Serra², Riccardo Caccialanza¹, Paolo Pedrazzoli^{2,3}

¹ Clinical Nutrition and Dietetics Unit, Fondazione IRCCS Policlinico San Matteo, Pavia, Italy

² Medical Oncology Unit, Fondazione IRCCS Policlinico San Matteo, Pavia, Italy

³ Internal Medicine Department, University of Pavia, Pavia, Italy

* Correspondence to: ✉ v.daprat@smatteo.pv.it, <https://orcid.org/0000-0001-8783-1904>.

Doi: 10.48286/aro.2023.66

Impact statement: Nutritional support of cancer patients is still suboptimal. This Editorial describes the critical issues and challenges in malnutrition management in oncology.

Key words: *malnutrition; clinical nutrition; anti-cancer diet; multidisciplinary; nutritional screening*

Received: May 1, 2023/**Accepted:** May 15, 2023/

Published: June 15, 2023.

Clinicians often consider nutritional care as a non-essential step in patients' evaluation and treatment. This also happens in Oncology, even though it is well known that an altered nutritional status has a disastrous impact on patients' response to treatment, quality of life, and survival. Overall, it has been estimated that up to 57% of patients with stage IV cancer are malnourished or at risk of malnutrition at the time of diagnosis (1). Many factors contribute to the development of malnutrition in cancer patients, with several differences according to cancer type and setting (2). In all patients, especially in advanced stages, the deregulation of systemic inflammation pathways leads to metabolic derangements including increase in muscle catabolism and switch to acute-phase protein synthesis. In patients with gastrointestinal cancer, mechanical (e.g., bowel obstruction) or functional factors (e.g., exocrine insufficiency) contribute to the impairment of nutritional status. Moreover, anticancer treatments often cause anorexia, mucositis, nausea, diarrhea, or other nutrition-related side effects. Finally, psychological effects can promote the reduction of food intake and physical activity.

A large number of clinical studies have demonstrated the deleterious effects of poor nutritional status (3). In particular, in the hospital setting malnutrition is associated with prolonged length of

stay, increased post-surgical complication rates, higher susceptibility to infections, increased mortality, and higher hospital costs (4).

Nutritional support has been demonstrated to improve all the aforementioned outcomes, including survival (5, 6). It can be delivered through different modalities, depending on patients' conditions and wills. The first step in nutritional support is usually dietary counseling, which consists in individualized nutritional advice aimed at modifying eating habits to meet patient's energy and nutrient requirements. If food intake is scarce, oral nutritional supplements can be prescribed. If global oral intake is insufficient, enteral and parenteral nutrition can be used to provide a sufficient amount of calories, macronutrients and micronutrients. In particular, enteral nutrition requires a functioning gastrointestinal tract, while parenteral nutrition should be used if gastrointestinal tract is not accessible or in case of insufficient oral and enteral intake (7).

In the everyday sense of the word, malnutrition is defined as a detrimental condition resulting from deficiencies in nutrient intake or malabsorption. However, nutritional support may be needed also in patients with normal intakes and absorption, both for malnutrition prevention and for the management of associated conditions, including sarcopenia. Sarcopenia is a progressive and generalized skeletal muscle

disorder that is associated with increased likelihood of adverse outcomes including falls, fractures, physical disability, and mortality (8). Nutritional support is crucial in sarcopenia management and it should be delivered in the setting of a multidisciplinary approach that includes physical therapy. Sarcopenia is probably less recognized and treated than malnutrition, with deleterious effect that contribute worsening clinical outcomes in cancer patients (9, 10).

Despite the importance of nutrition in this setting, the proportion of cancer patients undergoing nutritional evaluation is still scarce. In particular, a nutritional consultation rate ranging from 8.4% in stage IV to 3.8% in limited-stage cancer patients was described in a recent survey (11). This probably depends on multiple factors which should be addressed at the institutional level in order to improve patients' nutritional management.

One of the most critical issues in nutritional care is the poor attention paid to early detection of malnutrition signs. The importance of weight loss is often underestimated; for example, if patients have undergone surgical procedures or exams causing temporary reduction of food intake, weight loss may be misinterpreted as a temporary "para-physiological" condition related to fasting, rather than a possible alarm sign of the deterioration of nutritional status. Moreover, due to short duration of outpatient oncological visits, an adequate nutritional evaluation is often not performed. Also, in hospitalized patients the shortage of medical and nursing personnel makes it difficult to include nutritional evaluation in the routine clinical practice, despite the usage of nutritional screening being recommended by international guidelines (7). However, screening with validated tools like the Malnutrition Universal Screening Tool (MUST) or the Nutritional Risk Screening 2002 (NRS 2002) only requires a few minutes of focused questions on weight loss, information about patient's disease and age, and detection of body weight and height (12). In particular, the NRS-2002 tool allows the rapid identification of patients at risk of malnutrition through a scoring system based on: nutritional impairment (0 points if none, 1 point if weight loss >5% in 3 months or food intake 50-75% of normal in the past week, 2 points if weight loss >5% in 2 months or food intake 25-50% of normal in the past week, 3 points if weight loss >5% in 1 month or BMI <18.5 plus impaired general conditions or food intake <25% of normal in the last week), disease severity (0 points if patient's disease is associated with normal nutritional requirements, 1 point

in case of hip fracture or chronic disease, including cancer, 2 points in case of major abdominal surgery, severe pneumonia, stroke, or hematologic malignancy; 3 points in case of head injury, bone marrow transplant, ICU patients), and age (1 point if equal or greater than 70 years); patients with total score of 0-2 are at low risk of malnutrition, while patients with score equal or greater than 3 are at medium or high risk. Institutions should evaluate the need of requiring mandatory nutritional screening for all patients or, at least, for high-risk patients (*e.g.*, oncological, and gastroenterological units' patients) in order to guarantee the timely recognition of impaired nutritional status.

Ideally, all patients should be evaluated also for sarcopenia risk through the available screening tools, such as SARC-F questionnaire (13). SARC-F questionnaire could be completed by patients themselves, since it is composed by five simple questions assessing the number of falls in the last year (0 points if none, 1 point if 1-3 falls, 2 points if more than 2 falls) and difficulties in lifting and carrying a weight of 4-5 kilograms, walking across a room, transferring from a chair or bed, and climbing 10 stairs (0 points each if no difficulty, 1 point if some difficulty, 2 points if many difficulties); patients with a total score of 4 points or more are at risk of sarcopenia. Patients at risk of malnutrition and/or sarcopenia should then undergo a complete nutritional evaluation in order to start the adequate nutritional support. The diagnosis of malnutrition should be confirmed by diagnostic criteria such as the Global Leader Initiative for Malnutrition (GLIM) criteria (14). Sarcopenia should be diagnosed by assessing the presence of low muscle mass, low muscle strength, and poor physical performance (8). In particular, muscle mass can be evaluated by simple and reproducible techniques such as bioimpedance analysis, which allows the estimation not only of appendicular skeletal mass, but also of important prognostic indexes such as phase angle (8); CT scan images can be processed by a dedicated software to calculate the skeletal mass quantity and density at L3 level; ultrasound, dual-energy x-ray absorptiometry and clinical approaches (*i.e.*, anthropometry and physical examination) could also be used. Muscle strength can be easily measured with a handgrip dynamometer or with the chair-stand test, while physical performance can be evaluated with tests such as the Short Physical Performance Battery test or the gait speed test. Unfortunately, even if malnutrition risk is identified,

it is often difficult to guarantee a specialized clinical nutritional evaluation to all patients. This is due to the lack of nutritional services in many hospitals and to the low number of clinical nutrition specialists in general. Moreover, if malnutrition is identified and nutritional support is needed, the prescription of nutritional supplements is not always available to patients, depending on the different countries' reimbursement policies. Even in the same country, the availability of nutritional support products may be heterogeneous.

The obvious consequence of the inadequate nutritional management of cancer patients is the progressive deterioration of nutritional status, leading to worse oncological outcomes, as mentioned above. The less evident but problematic consequence may be related to the patients searching for alternative anti-cancer diets, which often contribute to worsen nutritional status rather than ameliorating clinical outcomes (13, 14). In fact, in the last years nutritional advice regarding anti-cancer diets has often been delivered by social media and self-proclaimed experts, with increased risks due to a progressive detachment from the scientific bases of nutritional support. Unfortunately, in many Universities clinical nutrition courses are optional or simply inexistent, leading to scarce availability of clinical nutrition expert personnel. Inevitably, nutritional care needs to be part of the graduate and postgraduate formation programs for doctors of whichever specialty, in order to allow an adequate nutritional management by clinicians. In particular, clinical nutrition should be part of the Oncology residents' rotation plans and courses, aiming at facilitating the future multidisciplinary collaboration between clinical nutrition specialists and oncologists through a common background.

In this scenario, multidisciplinary working groups including oncologists and clinical nutritionists have been constituted both at the national/international level and in the hospital setting, in order to ameliorate patients' management (15). Patients associations have greatly contributed in increasing the awareness on the importance of nutritional support in cancer care, leading to a productive collaboration with nutritional and oncological societies. On the opposite, clinicians have started involving their patients in the health care process through the so-called "patient empowerment". Empowerment has been defined as the intention to promote patients' abilities of taking greater control of their own health (16). In nutritional oncology, it may be applied for example in the self-monitoring of weight or food intake chang-

es or in the self-administration of questionnaires or nutritional screening tools (17). Moreover, patients' associations have great merit in the creation of cooperative groups of patients, where peer to peer advice is given on the everyday cancer-related issues. In conclusion, the awareness on the complex reality of nutritional care is slowly raising, but more focused interventions are needed in order to improve cancer patients' nutritional management. Malnutrition is still under-recognized due to reduced utilization of nutritional screening tools, defective early identification of malnutrition, poor availability of nutritional services, and inadequate university training. These conditions may lead to worsening of patients' clinical outcomes and may favor the choice of non-scientific nutritional approaches. In this setting, the collaboration among clinicians and patients is essential, and could benefit from increasing patients' empowerment. Also, the multidisciplinary teamwork is crucial to ensure adequate nutritional care to patients. For example, the inclusion of clinical nutrition specialists in oncological hospital boards could improve the timeliness of nutritional interventions and could help optimizing patients' fitness before medical and surgical treatments.

The attention paid to nutritional care is increasing, thanks to the efforts of national and international scientific societies, with the help of patients' associations. In the near future, nutritional screening will hopefully become mandatory for all cancer patients and nutritional support will be guaranteed as one of individuals' fundamental rights (18), thus being available to all patients, regardless of their conditions or disease stage.

COMPLIANCE WITH ETHICAL STANDARDS

Fundings

There were no institutional or private fundings for this article.

Conflict of interests

The Authors have declared no conflict of interests.

Authors' contributions

The Authors confirm contribution to the paper as follows: conception and supervision: RC, PP; manuscript preparation and design: VD; draft review and input to manuscript preparation: AC, EC, GP, LP, FS.

REFERENCES

- Muscaritoli M, Lucia S, Farcomeni A, Lorusso V, Saracino V, Barone C, et al. Prevalence of malnutrition in patients at first medical oncology visit: The PreMiO study. *Oncotarget*. 2017;8(45):79884-96. doi: 10.18632/oncotarget.20168.
- Bossi P, Delrio P, Mascheroni A, Zanetti M. The Spectrum of Malnutrition/Cachexia/Sarcopenia in Oncology According to Different Cancer Types and Settings: A Narrative Review. *Nutr*. 2021;13(6):1980. doi: 10.3390/nu13061980.
- Norman K, Pichard C, Lochs H, Pirlich M. Prognostic impact of disease-related malnutrition. *Clin Nutr*. 2008;27(1):5-15. doi: 10.1016/j.clnu.2007.10.007.
- Correia MITD, Waitzberg DL. The impact of malnutrition on morbidity, mortality, length of hospital stay and costs evaluated through a multivariate model analysis. *Clin Nutr*. 2003;22(3):235-9. doi: 10.1016/s0261-5614(02)00215-7.
- Bargetzi L, Brack C, Herrmann J, Bargetzi A, Hersberger L, Bargetzi M, et al. Nutritional support during the hospital stay reduces mortality in patients with different types of cancers: secondary analysis of a prospective randomized trial. *Ann Oncol*. 2021;32(8):1025-33. doi: 10.1016/s0261-5614(02)00215-7.
- Kaegi-Braun N, Kilchoer F, Dragusha S, Gressies C, Faessli M, Gomes F, et al. Nutritional support after hospital discharge improves long-term mortality in malnourished adult medical patients: Systematic review and meta-analysis. *Clin Nutr*. 2022;41(11):2431-41.
- Arends J, Bachmann P, Baracos V, Barthelmy N, Bertz H, Bozzetti F, et al. ESPEN guidelines on nutrition in cancer patients. *Clin Nutr*. 2017;36(1):11-48.
- Cruz-Jentoft AJ, Bahat G, Bauer J, Boirie Y, Bruyère O, Cederholm T, et al. Sarcopenia: revised European consensus on definition and diagnosis. *Age Ageing*. 2019;48(1):16. doi: 10.1093/ageing/afz046.
- Cereda E, Pedrazzoli P, Lobascio F, Masi S, Crotti S, Klersy C, et al. The prognostic impact of BIA-derived fat-free mass index in patients with cancer. *Clin Nutr*. 2021;40(6):3901-7. doi: 10.1016/j.clnu.2021.04.024.
- Deutz NEP, Ashurst I, Ballesteros MD, Bear DE, Cruz-Jentoft AJ, Genton L, et al. The Underappreciated Role of Low Muscle Mass in the Management of Malnutrition. *J Am Med Dir Assoc*. 2019;20(1):22-7. doi: 10.1016/j.jamda.2018.11.021.
- Caccialanza R, Goldwasser F, Marschal O, Ottery F, Schiefke I, Tilleul P, et al. Unmet needs in clinical nutrition in oncology: a multinational analysis of real-world evidence. *Ther Adv Med Oncol*. 2020;12. 1758835919899852. doi: 10.1177/1758835919899852.
- Kondrup J, Allison SP, Elia M, Vellas B, Plauth M. ESPEN Guidelines for Nutrition Screening 2002. *Clin Nutr*. 2003;22(4):415-21. doi: 10.1016/s0261-5614(03)00098-0.
- Malmstrom TK, Morley JE. SARC-F: a simple questionnaire to rapidly diagnose sarcopenia. *J Am Med Dir Assoc*. 2013;14(8):531-2. doi: 10.1016/j.jamda.2013.05.018.
- Cederholm T, Jensen GL, Correia MITD, Gonzales MC, Fukushima R, Higashiguchi T, et al. GLIM criteria for the diagnosis of malnutrition - A consensus report from the global clinical nutrition community. *Clin Nutr*. 2019;38(1):1-9. doi: 10.1016/j.clnu.2018.08.002.
- Huebner J, Marienfeld S, Abbenhardt C, Ulrich C, Muenstedt K, Micke O, et al. Counseling patients on cancer diets: a review of the literature and recommendations for clinical practice. *Anticancer Res*. 2014;34(1):39-48. Available from: <https://ar.iijournals.org/content/34/1/39>. long. Accessed: May 15, 2023.
- Pedrazzoli P, Rosti G, Caccialanza R. A novel approach to nutrition in prevention and treatment of cancer: a provocative call. *Ann Res Oncol*. 2022;02(03):209. doi: 10.48286/aro.2022.50.
- Caccialanza R, Cotogni P, Cereda E, Bossi P, Aprile G, Delrio P, et al. Nutritional Support in Cancer patients: update of the Italian Intersociety Working Group practical recommendations. *J Cancer*. 2022;13(9):2705-16. doi: 10.7150/jca.73130.
- World Health Organization. WHO Guidelines on Hand Hygiene in Health Care: First Global Patient Safety Challenge Clean Care Is Safer Care. 2009. Available from: <https://www.who.int/publications/i/item/9789241597906>. Accessed: May 2023.
- Casirati A, Da Prat V, Cereda E, Serra F, Perrone L, Corallo S, et al. The Key Role of Patient Empowerment in the Future Management of Cancer-Related Malnutrition. *Nutrients*. 2023;15(1):235. doi: 10.3390/nu15010235.
- Caccialanza R, De Lorenzo F, Gianotti L, Zagonel V, Gavazzi C, Farina G, et al. Nutritional support for cancer patients: still a neglected right? *Support Care Cancer*. 2017;25(10):3001-4. doi: 10.1007/s00520-017-3826-1.