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The nutritional needs of older cancer survivors

Amber Kleckner, PhD[1,*],

Allison Magnuson, DO, MS[2]

[1]Department of Pain and Translational Symptom Science, School of Nursing, University of Maryland Baltimore, Baltimore, MD, 21201, United States

[2]Department of Medicine, Wilmot Cancer Institute, University of Rochester Medical Center, Rochester, NY, 14534, United States

Brief summary

Older adults comprise a large proportion of cancer survivors, and older cancer survivors have distinct nutritional needs. Herein, we summarize nutritional needs of older cancer survivors, describe approaches to identify nutritional impairments, and provide guidelines for clinicians to address nutritional needs.

Keywords

nutrition; survivorship; malnutrition; obesity; supportive care

1. Introduction

Over the last 20 years, the number of cancer survivors in the United States has more than doubled, with approximately 17 million cancer survivors today [1]. Moreover, nearly two-thirds of cancer survivors (64%) are 65 years or older [2]. Current projections show steady incidence rates, and cancers such as breast cancer, Hodgkin lymphoma, and prostate cancer have 5-year survival rates greater than 89% [2]. Herein, we define cancer survivorship as starting at a diagnosis of cancer and following the person through treatment (if any) and the rest of their life [3]. Therefore, this definition encompasses individuals undergoing active treatment (e.g., chemotherapy) either in the curative-intent or advanced disease (e.g. palliative intent) stages, as well as those who have completed active therapy. While receiving cancer therapy, and after completion of active treatment, many cancer survivors live with persistent symptoms or side effects of their treatment. The growing field of supportive care in cancer is addressing these persistent ailments by integrating curative models of care and

*Corresponding author. amber.kleckner@umaryland.edu.

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palliative care. Emerging evidence suggests that nutrition is a powerful and underutilized tool that cancer survivors can leverage to meet their supportive care needs [4].

Nutrition is especially important among older cancer survivors to attenuate common issues of aging, many of which are exacerbated by the cancer experience. For example, cachexia—loss of lean and fat mass resulting from cancer or another chronic disease—and sarcopenia—the loss of lean muscle mass—are common and detrimental aging-related concerns. Malnutrition, as defined by insufficient acquisition of nutrients, is particularly worrisome among older cancer patients due to its high prevalence (25% to 85%) [5] and association with all-cause mortality [6]. It can be caused by low food intake, poor nutrient uptake, and insufficient digestive organ function. Obesity, or excess body fat, is equally as prevalent (e.g., 55% in the Cancer Prevention Study-II Nutrition Cohort in the United States [7]). Obesity can mask signs of clinical malnutrition, and can increase risk of many other aging-related conditions. Indeed, sarcopenic obesity, or the combined burden of obesity and sarcopenia, is associated with negative clinical outcomes in patients with cancer, including higher risk of chemotherapy dose-limiting toxicities, surgical complications, physical disability, and shorter survival [8].

Nutrition is important in long-term survivorship for older adults for many reasons [9]. For one, nutritional issues during cancer treatment tend to be underdiagnosed and not addressed [4,10], and these problems can persist for years into survivorship. Second, cancer and its treatments can cause long-term side effects that affect the ability to eat such as persistent diarrhea and trouble swallowing. In fact, treatment for several types of cancers entail significant alternations to the gastrointestinal tract, and patients need help managing these issues. Third, patients are often interested in behavioral strategies such as diet to reduce the risk of cancer recurrence. Lastly, good nutrition can help manage comorbidities such as diabetes and hypertension and generally promote health. Accordingly, the Institute of Medicine recommends that nutritional services are provided throughout a patients' cancer experience, and especially as they complete adjuvant cancer treatment [11]. However, unfortunately, nutritional issues are often not discussed—in fact, 0/26 survivorship care plan templates from NCI-designated comprehensive cancer centers across the United States mentioned nutritional services in a meta-analysis by Salz et al. [12]. This perspective is not meant to be a comprehensive guide to nutritional practices around substantial procedures (e.g., complete surgical resection of the pancreas for curative treatment of pancreatic cancer); clinicians are encouraged to follow evidence-based recommendations to promote nutritional status before and after these procedures. The goal of this perspective is to briefly summarize the nutritional needs of older cancer survivors, describe validated approaches to identify malnutrition and obesity, and provide current evidence-based and experience-based nutritional recommendations to improve the nutritional status of this population.

2. Screening for and addressing malnutrition and obesity

Older adults ought to be screened for malnutrition and obesity upon a diagnosis of cancer and regularly throughout survivorship, especially at major cancer treatment- and health-related milestones and events (Table 1) [13]. Malnutrition, when diagnosed early, can be addressed with diet to prevent or treat sarcopenia, especially as part of a multimodal

intervention with exercise [14]. Additionally, obesity is a risk factor for poorer cancer outcomes [15] as well as many other diseases of aging [16]. Importantly, malnutrition and obesity can co-occur, and malnutrition and sarcopenia are often overlooked in the presence of obesity [17].

To identify malnutrition in older cancer survivors, the Geriatric Assessment, which is recommended by the National Comprehensive Cancer Network [18,19] and the International Society of Geriatric Oncology [20], includes a nutrition domain that comprises recent weight loss and the Mini-Nutritional Assessment-Short Form (MNA) [21]. The MNA-SF is a brief, six-item questionnaire completed by the clinical care team that captures changes in food intake, recent weight loss, mobility, the presence of psychological problems, and body mass index (BMI). Specifically, if a person has unintentionally lost more than 10% of their body weight in the previous 6 months and/or scores 11 points or less on the MNA-SF (indicating they are at risk for malnutrition or malnourished), they will be flagged as having nutritional impairment on the Geriatric Assessment.

If a person is identified as being malnourished, it is important to investigate the cause of the malnutrition so that treatments can be targeted. The *quantity* (total calories) and *quality* (nutrient density) of diet patterns are both important. For patients with unintentional loss of lean mass, sufficient protein intake can slow or reverse this loss, especially in combination with physical activity. Patients might have symptoms that hinder food intake including low appetite, mucositis (mouth sores), xerostomia (dry mouth), nausea, vomiting, diarrhea, and/or constipation; these symptoms can often be treated with medication. Additionally, these symptoms may be side effects from cancer treatment or other supportive therapy medications, so careful medication review is important to determine potential contributors and guide potential treatment modifications.

To identify obesity, BMI ([weight in kg] / [height in m]^2) is a common tool—those with a BMI ≥25 kg/m^2 are considered overweight and those with a BMI≥30 kg/m^2 are considered obese. While BMI is designed to easily identify excess body fat, it can inaccurately categorize people with high muscle mass into the overweight or obese categories despite low body fat. In these cases, more accurate measures of body composition are indicated including skin fold, bioelectric impedance analysis (BIA), or dual x-ray absorptiometry (DXA).

For patients who are overweight or obese, low-calorie diets can decrease excess body fat, especially in combination with exercise. If a person is undergoing active treatment, it is especially important for weight loss to occur under the supervision of an oncology dietitian to avoid malnutrition.

3. Nutritional recommendations for all older cancer survivors

First and foremost, it is important for the clinic care team to communicate directly with survivors regarding concerns related to nutrition, including how treatment may impact dietary practices and body composition. Table 2 includes recommendations to address various nutritional concerns. Ideally, a nutritionist or dietitian is part of the clinical care

team, preferably one who is familiar with the cancer trajectory. Registered Dietitians (RDs) can receive credentials for their specialization in oncology— “CSO” credentialing indicates Board Certified Specialist in Oncology Nutrition.

For general nutrition matters, the American Cancer Society (ACS) [22] and the American Institute for Cancer Research (AICR) [15] provide nutrition guidelines for cancer survivors with a focus on life post-adjuvant treatment. These recommendations entail staying hydrated, maintaining a healthy body weight, and consuming a diet high in fruits, vegetables, and whole grains; the ACS discourages red meat and processed foods and the AICR encourages beans [15,22]. The ACS and AICR recommendations are based on thorough systematic reviews for cancer prevention as well as secondary cancer prevention, though they do not address clinical nutrition issues that older survivors face as a direct result of cancer treatment, issues in supportive care, or specific comorbidities that many older individuals sustain. A healthy diet can promote a healthy gut and digestion, facilitate efficient metabolism and physiology, achieve or maintain a healthy body composition, reduce chronic inflammation, minimize oxidative stress, and prevent insulin resistance. Indeed, physiological changes occur with aging and make these processes especially vulnerable to cancer- and cancer treatment-induced impairments. In addition, comorbidities such as type II diabetes and hypertension can be managed with diet. There are many barriers to healthy eating, and open discussions can help identify and address these barriers. For example, discussions regarding healthy eating should include patients’ access to fresh fruit and vegetables, their ability to prepare food on their own, and with whom they tend to consume meals. Provide relevant handouts that educate patients on good nutritional practices, malnutrition, and/or weight loss. Also, familiarize yourself with smartphone apps that may be helpful for your population (e.g., MyFitnessPal for logging diet and exercise, Instacart for food delivery, Headspace for meditation).

For older adults, specifically, side effects of cancer can be compounded by natural aging. For patients with metabolic comorbidities (e.g., diabetes, hypertension), contact with the primary care provider is crucial to ensure that plans to address nutritional concerns are in place. The Geriatric Assessment may reveal pertinent domains that contribute to nutritional concerns. For example, older patients with impaired Instrumental Activities of Daily Living (IADL; e.g., transportation, meal preparation) and limited social support may have more barriers related to access to healthy food. Changes in eating patterns and food consumption are also more common in older adults with advanced cognitive impairment [23,24]. Patients might have problems with dentition, dentures, chewing, or swallowing, which may have existed prior to the cancer or which was exacerbated by the cancer and its treatments. In this case, consider referring the individual to a dentist or oral care specialist. For patients who have limited access to local services, fortunately phone- and internet-based services are becoming much more accessible. It is recommended that clinicians have handouts that can connect patients with local social groups, a registered dietitian (local or remote), and other services based on their community, mobility, etc., starting with the organizations listed in Table 2.

In addition to general nutrition advice, survivors may need help managing long-term side effects that affect their ability to eat. For example, patients who underwent surgery for colon cancer may have an ostomy, and patients who had radiation to the gut may experience

intolerances to fiber, fat, or other nutrients. Patients will need a relationship with an accessible clinician to advise them on portion sizes, meal frequency, medications, meal replacement products, use of exogenous enzymes, ostomy management, and other specific and ever-changing concerns.

Many survivors also deal with persistent issues of supportive care such as cancer-related fatigue and chemotherapy-induced neuropathy. Healthy dietary patterns that include fruits, vegetables, whole grains, and omega-3 fatty acids are often associated with fewer and less severe symptoms as well as higher quality of life [25,26]. Thus, introducing strategies to improve overall diet quality are warranted until more targeted nutrition therapies are available.

Many patients are interested in what supplements can help reduce the risk of cancer recurrence. Unfortunately, due to the large heterogeneity of the survivor population, there is not enough evidence to recommend any supplements for secondary cancer prevention at this time; the AICR recommends following guidelines for primary cancer prevention [15].

4. Including nutritional recommendations in the survivorship care plan

The survivorship visit at the completion of adjuvant treatment and the survivorship care plan are an excellent time and place to provide patients with information on resources to address long-term nutritional issues. Individualized survivorship care plans provide patients and their caregivers a guide to effectively transition from curative cancer treatment to extended survivorship [11]. Indeed, survivors have indicated their desire for dietary advice as part of a survivorship care plan [27] and, therefore, it is recommended to develop the survivorship care plan in accordance with a nutritionist [28].

5. Conclusions

In summary, nutritional needs for older cancer survivors are often overlooked and not addressed. It behooves clinicians caring for older adults with cancer and the clinical care team to formally screen for nutritional impairments, have established relationships with a registered dietitian or nutritionist, and have recommendations on hand for survivors to meet their nutritional needs and overcome barriers to healthy eating.

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List of abbreviations

ACS	American Cancer Society
AICR	American Institute for Cancer Research
BMI	Body mass index
MNA-SF	Mini-Nutritional Assessment-Short Form

NCI	National Cancer Institute

References

1. National Cancer Institute. Cancer Statistics. Availabe online: https://www.cancer.gov/about-cancer/understanding/statistics (accessed on
2. American Cancer Society. Cancer Facts and Figures 2019; American Cancer Society, Atlanta, GA, 2019.
3. Marzorati C; Riva S; Pravettoni G Who Is a Cancer Survivor? A Systematic Review of Published Definitions. J Cancer Educ 2017, 32, 228–237, doi:10.1007/s13187-016-0997-2. [PubMed: 26854084]
4. Presley CJ; Dotan E; Soto-Perez-de-Celis E; Jatoi A; Mohile SG; Won E; Alibhai S; Kilari D; Harrison R; Klepin HD, et al. Gaps in nutritional research among older adults with cancer. J Geriatr Oncol 2016, 7, 281–292, doi:10.1016/j.jgo.2016.04.006. [PubMed: 27197919]
5. D'Almeida CA; Peres WAF; de Pinho NB; Martucci RB; Rodrigues VD; Ramalho A Prevalence of Malnutrition in Older Hospitalized Cancer Patients: A Multicenter and Multiregional Study. J Nutr Health Aging 2020, 24, 166–171, doi:10.1007/s12603-020-1309-4. [PubMed: 32003406]
6. Zhang X; Tang T; Pang L; Sharma SV; Li R; Nyitray AG; Edwards BJ Malnutrition and overall survival in older adults with cancer: A systematic review and meta-analysis. Journal of Geriatric Oncology 2019, 10, 874–883, doi:10.1016/j.jgo.2019.03.002. [PubMed: 30917937]
7. Maliniak ML; Patel AV; McCullough ML; Campbell PT; Leach CR; Gapstur SM; Gaudet MM Obesity, physical activity, and breast cancer survival among older breast cancer survivors in the Cancer Prevention Study-II Nutrition Cohort. Breast Cancer Res Treat 2018, 167, 133–145, doi:10.1007/s10549-017-4470-7. [PubMed: 28856470]
8. Carneiro IP; Mazurak VC; Prado CM Clinical Implications of Sarcopenic Obesity in Cancer. Curr Oncol Rep 2016, 18, 62, doi:10.1007/s11912-016-0546-5. [PubMed: 27541923]
9. National Comprehensive Cancer Network (NCCN). NCCN Clinical Practice Guidelines in Oncology: Survivorship. Availabe online: https://www.nccn.org/guidelines/guidelines-detail?category=3&id=1466 (accessed on 2 DEC 2021).
10. Liposits G; Orrevall Y; Kaasa S; Osterlund P; Cederholm T Nutrition in cancer care: A brief, practical guide with a focus on clinical practice. JCO Oncology Practice 2021, 10.1200/OP.20, doi: 10.1200/OP.20.
11. The National Research Council. From Cancer Patient to Cancer Survivor: Lost in Transition; The National Academies Press: Washington, DC, 2006; 10.17226/11468.
12. Salz T; Oeffinger KC; McCabe MS; Layne TM; Bach PB Survivorship care plans in research and practice. CA Cancer J Clin 2012, 62, 101–117, doi: 10.3322/caac.20142. [PubMed: 22241452]
13. Anderson AS; Martin RM; Renehan AG; Cade J; Copson ER; Cross AJ; Grimmett C; Keaver L; King A; Riboli E, et al. Cancer survivorship, excess body fatness and weight-loss intervention-where are we in 2020? Br J Cancer 2021, 124, 1057–1065, doi: 10.1038/s41416-020-01155-2. [PubMed: 33235316]
14. Cruz-Jentoft AJ; Kiesswetter E; Drey M; Sieber CC Nutrition, frailty, and sarcopenia. Aging Clinical and Experimental Research 2017, 29, 43–48. [PubMed: 28155181]
15. World Cancer Research Fund; American Institute for Cancer Research. Diet, Nutrition, Physical Activity, and Cancer: A Global Perspective; dietandcancerreport.org, 2018.
16. Frasca D; Blomberg BB; Paganelli R Aging, Obesity, and Inflammatory Age-Related Diseases. Front Immunol 2017, 8, 1745, doi:10.3389/fimmu.2017.01745. [PubMed: 29270179]
17. Baracos VE; Arribas L Sarcopenic obesity: hidden muscle wasting and its impact for survival and complications of cancer therapy. Annals of Oncology 2018, 29, ii1–ii9, doi: 10.1093/annonc/mdx810.
18. Mohile SG; Velarde C; Hurria A; Magnuson A; Lowenstein LM; Pandya C; O'Donovan A; Gorawara-Bhat R; Dale W Geriatric Assessment-Guided Care Processes for Older Adults: A Delphi Consensus of Geriatric Oncology Experts. Journal of the National Comprehensive Cancer Network 2015, 13, 1120–1130. [PubMed: 26358796]

19. National Comprehensive Cancer Network (NCCN). NCCN Clinical Practice Guidelines in Oncology: Older Adult Oncology. Availabe online: https://www.nccn.org/guidelines/guidelines-detail?category=4&id=1452 (accessed on 2 DEC 2021).
20. Wildiers H; Heeren P; Puts M; Topinkova E; Janssen-Heijnen ML; Extermann M; Falandry C; Artz A; Brain E; Colloca G, et al. International Society of Geriatric Oncology consensus on geriatric assessment in older patients with cancer. J Clin Oncol 2014, 32, 2595–2603, doi: 10.1200/JCO.2013.54.8347. [PubMed: 25071125]
21. Rubenstein LZ; Harker JO; Salva A; Guigoz Y; Vellas B Screening for undernutrition in geriatric practice: Developing the short-form Mini-Nutritional Assessment (MNA-SF). Journal of Gerontology 2001, 56A.
22. Rock CL; Doyle C; Demark-Wahnefried W; Meyerhardt J; Courneya KS; Schwartz AL; Bandera EV; Hamilton KK; Grant B; McCullough M, et al. Nutrition and physical activity guidelines for cancer survivors. CA Cancer J Clin 2012, 62, 243–274, doi: 10.3322/caac.21142. [PubMed: 22539238]
23. Ikeda M; Brown J; Holland AJ; Fukuhara R; Hodges JR Changes in appetite, food preference, and eating habits in frontotemporal dementia and Alzheimer's disease. J Neurol Neurosurg Psychiatry 2002, 73, 371–376. [PubMed: 12235302]
24. Morris CH; Hope RA; Fairburn CG Eating habits in dementia. A descriptive study. Br J Psychiatry 1989, 154, 801–806, doi:10.1192/bjp.154.6.801. [PubMed: 2597886]
25. Baguley BJ; Skinner TL; Wright ORL Nutrition therapy for the management of cancer-related fatigue and quality of life: a systematic review and meta-analysis. Br J Nutr 2019, 122, 527–541, doi: 10.1017/S000711451800363X. [PubMed: 30526701]
26. Inglis JE; Lin PJ; Kerns SL; Kleckner IR; Kleckner AS; Castillo DA; Mustian KM; Peppone LJ Nutritional Interventions for Treating Cancer-Related Fatigue: A Qualitative Review. Nutr Cancer 2019, 71, 21–40, doi: 10.1080/01635581.2018.1513046. [PubMed: 30688088]
27. Krok-Schoen JL; Naughton MJ; Noonan AM; Pisegna J; DeSalvo J; Lustberg MB Perspectives of Survivorship Care Plans Among Older Breast Cancer Survivors: A Pilot Study. Cancer Control 2020, 27, 1073274820917208, doi:10.1177/1073274820917208. [PubMed: 32233798]
28. Hershman DL; Greenlee H; Awad D; Kalinsky K; Maurer M; Kranwinkel G; Brafman L; Jayasena R; Tsai WY; Neugut AI, et al. Randomized controlled trial of a clinic-based survivorship intervention following adjuvant therapy in breast cancer survivors. Breast Cancer Res Treat 2013, 138, 795–806, doi:10.1007/s10549-013-2486-1. [PubMed: 23542954]

Table 1.

Identifying malnutrition and obesity

Measure of nutritional status or body composition	**Purpose of measure**	**Criteria for concern**
Recent weight loss	To identify malnutrition	>10% unintentional weight loss in the last 6 months
Mini-Nutritional Assessment-Short Form	To identify malnutrition	A score of 0-7 points (“malnourished” or 8-11 points (“at risk for malnutrition”)
Body mass index (BMI; [weight in kg] / [height in m]^2)	To identify excess body fat	≥25 kg/m^2
	To identify low body fat	<18.5 kg/m^2

Table 2.

Recommendations to address nutritional concerns among older cancer survivors

Nutritional concern	**Potential recommendations**
Malnutrition	Try to identify the cause of malnutrition via discussion with the patient, caregiver(s), and the clinical care team
	Referral to a registered dietitian *
Unintentional weight loss	Nutritional supplements (e.g., Ensure®), small frequent meals, high protein/high calorie snacks
	Referral to a registered dietitian *
Low food intake due to low appetite, mucositis (mouth sores), xerostomia (dry mouth), nausea, vomiting, diarrhea, and/or constipation	Review treatment plan and medication list to identify the cause. Weigh risks and benefits of medications.
Excess body fat	Discuss barriers to healthy eating and/or exercise
	Provide handouts for weight loss (e.g., see the AICR website for up-to-date resources)
	Smartphone applications for weight loss, goal setting, or food logging (e.g., MyFitnessP al)
	Local social groups for weight loss or healthy lifestyles
Poor dentition or denture issues	Referral to a dentist
Speech or swallowing difficulties	Referral to an oral care specialist
Need for extra support for grocery shopping or meal preparation	Home-delivered meal programs from social services organization s (e.g., Meals on Wheels)
	Local grocery delivery services (e.g., Instacart)
	Local or nationwide meal delivery services (e.g., Blue Apron, Splendid Spoon)
Desire for personal diet or nutrition counseling and/or accountability	Referral to a registered dietitian *
	Provide handouts for nutrition in survivorship, weight loss, or weight gain (e.g., see the AICR website for up-to-date resources)
	Smartphone applications for weight loss, goal setting, or food logging (e.g., MyFitnessP al)
	Local social groups for weight loss or healthy lifestyles

* see oncologynutrition.org for board certified specialists in oncology by state

Abbreviations: AICR, American Institute for Cancer Research