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\* **Corresponding author.**

[dr.manish.goswami01@gmail.com](mailto:dr.manish.goswami01@gmail.com)

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## IAPEN India : Nutrition Consensus Guidelines in Oncology Clinical Practice

Shivshankar Timmanpyati<sup>1</sup>, Arvind Krishnamurthy<sup>2</sup>, Purvish Parikh<sup>3</sup>, Meenakshi Bajaj<sup>4</sup>, Sumant Gupta<sup>5</sup>, Purabi Mahajan<sup>1</sup>, Priti Arolkar<sup>1</sup>, Gargee Rai<sup>6</sup>, Rajeswari Alagirimunuswamy<sup>7</sup>, Arnab Gupta<sup>8</sup>, Nagaraj Huilgol<sup>9</sup>, Shamali Poojary<sup>1</sup>, Nandita Dhanaki<sup>10</sup>, Fagun Gandhi<sup>10</sup>, Rajeshwari Prem<sup>11</sup>, Shaveta Bhatta<sup>12</sup>, M V Chandrakant<sup>13</sup>, C Reena<sup>14</sup>, Savita Goswami<sup>1</sup>, Arun Balaji<sup>1</sup>, Manjusha Vagal<sup>1</sup>, Meenu Walia<sup>15</sup>, Esther Sathiaraj<sup>16</sup>, Manish Goswami<sup>17\*</sup>

**1** Tata Memorial Hospital (HBNI), Mumbai, India

**2** Cancer Institute (WIA), Chennai, Adyar, India

**3** Asian Institute of Oncology, Mumbai, India

**4** Tamil Nadu Govt Multi Super Specialty Hospital, Chennai, India

**5** Sarvodaya Health Care, Faridabad, India

**6** National Cancer Institute, Nagpur, India

**7** Apollo Cancer Centre, Chennai, India

**8** Saroj Gupta Cancer Centre & Research Institute, Kolkatta, India

**9** Nanavati Max super speciality Hospital, Mumbai, India

**10** Navimumbai, India

**11** Homi Bhabha cancer hospital and research centre, Vishakapatnam, India

**12** Dayanand Medical College and Hospital, Ludhiana, India

**13** Narayana Superspeciality Hospital, Howrah, India

**14** Malabar cancer Centre, Thalassery, India

**15** Max Institute of Cancer Care, Delhi, India

**16** HCG Cancer Hospital

**17** Medica Cancer Hospital, West Bengal, India

### Abstract

Malnutrition is one of the most common and significant issue during the treatment of cancer. Poor nutritional management during the treatment may impede the progress in the treatment. Many international societies have nutritional recommendations published on their websites. India, being a multicultural population with varied nutritional habits and local beliefs have no cohesive evidence-based nutritional approach during and after treatment. The current guideline has been formulated jointly by oncologists, nutritionists, and multidisciplinary professionals with an aim to provide science based standard nutritional guidance to the community healthcare professionals across India. The committee referred to major international guidelines published in recent past. With intense deliberations adopted few selective recommendations which are compatible with Indian practice.

**Keywords:** Cancer; Nutrition; Consensus guideline; nutrition in cancer; IAPEN guidelines; IAPEN cancer guidelines

## 1. Introduction

Malnutrition, a significant issue among oncologic patients<sup>(1)</sup>, can reduce their physical functioning, quality of life and impact mortality<sup>(2,3)</sup>. According to recent literature, up to 51.1% of cancer patients may be diagnosed with malnutrition, and about 64% of them may experience significant weight loss within six months following their cancer diagnosis<sup>(1)</sup>. Cross-sectional studies from South Asia have reported a prevalence rate of malnutrition at 25-39%<sup>(4)</sup>. A 2013 study from India reported a prevalence rate of 86% at the time of admission to a tertiary care hospital in intensive care<sup>(5)</sup>. Another small research conducted in 60 Indian gynaecological patients reported a combined rate of risk or prevalence rate of 88.3%<sup>(6)</sup>. Hence, the prevalence rate of malnutrition depends on the study location and the overall status of nutrition in the region. Patients with severe malnutrition are at a higher risk of complications due to reduced response to treatment, poor treatment tolerance and a higher risk of toxicity<sup>(1)</sup>. Cachexia and sarcopenia occurring due to malnutrition aggravate these risks in patients suffering from cancer both in hospitalized as well non-hospitalized<sup>(7)</sup>. An early start of nutritional intervention can significantly improve body composition by lowering the risk of complications due to loss of muscle mass<sup>(7)</sup>. There is indirect indication that dietary counselling given with or without ONS had no effect on mortality but was associated with significant but heterogeneous benefits to weight, energy intake and some aspects of body composition<sup>(8)</sup>. Dietary counselling is crucial in patients with cancer to improve their oral intake and promote the consumption of foods that can improve their functional status<sup>(9,10)</sup>. During cancer, sufficient protein intake is the key, and the recent studies suggest a higher amount of protein be provided to cancer patients to help them in their treatment tolerance and efficacy<sup>(9)</sup>.

Micronutrients are crucial supplements recommended for oncologic patients to improve overall nutrient absorption, quality of life and enhance their rate of recovery, just like patients with other illness or general debility.

Malnutrition screening tools have been described for improving nutritional support for oncologic patients when screening is conducted on time<sup>(11)</sup>. This tool helps to bring significant and favourable changes in nutrient intake in oncology patients<sup>(11)</sup>. Screening tools in onco clinical practice are being used for management in South Asian settings also where the burden of malnutrition is higher<sup>(4)</sup>.

Hence, nutritional assessment, counselling and supplementation in patients has the potential to improve their weight, which could then translate into prolonged survival and improved quality of life<sup>(8,9,11,12)</sup>.

The need for formulating comprehensive nutritional care guidelines that can be implemented for hospitalized and non-hospitalized patients with cancer have been suggested in the

literature reviewed; however, this continues to be a major limitation.

Several nutritional guidelines such as the European Society for Clinical Nutrition and Metabolism (ESPEN)<sup>(13,14)</sup>, American Society for Parenteral and Enteral Nutrition (ASPEN)<sup>(15)</sup>, Spanish Society of Medical Oncology (SEOM)<sup>(16)</sup>, Speech and swallow rehabilitation in Head and Neck cancer : United Kingdom National Multidisciplinary guidelines<sup>(17)</sup>, European Society for Medical Oncology (ESMO)<sup>(18)</sup>, American Cancer Society (ACS)<sup>(19)</sup>, and National Comprehensive Cancer Network (NCCN)<sup>(20)</sup> are available. These guidelines are however not specific to Indian population. Indian patients are at a greater risk of protein malnutrition due to vegetarian diet being popular in the country<sup>(21)</sup>. Indian patients with head and neck cancer have been observed to have a compromised total dietary intake prior to nutritional intervention<sup>(22)</sup> which in turn has been correlated with the risk of anaemia and the loss of muscle mass in patients<sup>(23)</sup>. Hence, there is a need to formulate population-specific guidelines based on these considerations. The current guidelines will help overcome this gap by drawing on the insights provided by the existing guidelines, evidence, and the literature and giving consensus-based opinions for the cancer patients in India. It will focus both on the hospitalised and non-hospitalised oncologic adult patients for identification, prevention, and necessity in treatment of reversible elements of malnutrition.

## 2. Methodology

Our present consensus on practical guideline recommendations started with critical evaluation of European Society for Clinical Nutrition and Metabolism (ESPEN)<sup>(13,14)</sup>, Spanish Society of Medical Oncology (SEOM)<sup>(16)</sup>, Speech and swallow rehabilitation in Head and Neck cancer: United Kingdom National Multidisciplinary guidelines<sup>(17)</sup> and American Institute for Cancer research (AICR)'s New dietary guidelines committee report (2020). Their recommendations and references on which they were based, underwent several rounds of deliberations by our expert group. Unique factors specific to India and other LMIC (low and middle income countries) were also taken into consideration. Local dietary habits and cultural preferences were discussed. Based on these, the first draft of the guideline was circulated among the experts who provided their inputs based on which these final practical consensus recommendations were arrived at.

## 2.1 Nutritional risk screening and assessment for oncology patients

### Recommendation

Cancer patients should undergo nutrition screening at baseline and from time to time, on case to case basis as appropriate. For patients with abnormal screening, a comprehensive nutritional assessment can be done including objective and quantitative assessment of nutritional intake, nutrition impact symptoms, muscle mass, physical performance.

- Nutritional guidelines recommend screening and full assessment for nutritional risk at an early stage of cancer<sup>(24)</sup>
- As appropriate, oncology patients should be screened using a malnutrition screening tool at the time of diagnosis and throughout treatment on case to case basis.
- Patient-generated Subjective Global Assessment Scale (PG-SGA) is used to evaluate the nutritional risk of oncologic patients in both ambulatory and acute care settings<sup>(13,22,24,25)</sup>
- Muscle wasting is acknowledged as a predictor of lower quality of life, impaired functional status, risk of surgical complications and decreased survival<sup>(13)</sup>
- In cancer patients at risk of malnutrition, sarcopenia and cachexia, decreased muscle mass should be assessed<sup>(13)</sup>
- Information regarding body composition and imaging methods provide information on loss of muscle mass as well as fatty muscle infiltration<sup>(26)</sup>
- For rating physical performance scales, Eastern Cooperative Oncology Group, (ECOG), karnofsky scale, dynamometry, or gait speed can be used. Dual X-ray absorptiometry (DEXA), ultrasonography (USG), computed tomography scans at lumbar level 3, or bioimpedance analysis (BIA) can be used for the identification of reduction in muscle mass<sup>(13,16)</sup>.
- Systemic inflammation can be determined by measures of serum C-reactive protein (CRP) and serum albumin using modified Glasgow prognostic score<sup>(16)</sup>

## 2.2 Energy requirement

### Recommendation

\* Energy requirements for a cancer patient can be 25–30 kcal/kg/day.

\* This needs to be modified based on degree of physical activity, nutritional status, severity of malnutrition, stage of cancer, other co-morbidities and other metabolic abnormalities.

- Cancer patients' nutritional requirements are largely like those of the healthy population. The total energy requirement is the total of resting energy expenditure (REE), physical activity, and diet-induced thermogenesis<sup>(14)</sup>
- REE can remain unchanged, increased, or decreased depending on the non-tumor bearing controls, which can be determined by indirect calorimetry<sup>(14)</sup>
- Administration of both energy and protein in the presence of reduced oral intake influences both muscle strength and mass<sup>(27)</sup>

## 2.3 Protein Requirement

### Recommendation

\* Protein requirements for a cancer patient can be 1.2-1.5 g/kg/day

\* This needs to be modified in cancer patients based on degree of physical activity, nutritional status, severity of malnutrition, stage of cancer, co-morbidities, and other metabolic abnormalities

- Many cancer patients find it very difficult to meet the recommended protein intake of 1.2–1.5 g/kgBW/day<sup>(28)</sup>
- SEOM clinical guidelines<sup>(16)</sup> recommends around 1.2 - 1.5 g/kg/day, whereas ESPEN practical guidelines recommends above 1 g/kg/day and, can be increased upto 1.5 g/kg/day<sup>(14)</sup>.
- Some studies have been conducted with amino acids to prevent muscle mass wasting like supplementation with branched chain amino acids (leucine, isoleucine, and valine)<sup>(28)</sup>,  $\beta$ -hydroxy  $\beta$ -methyl butyrate (HMB), carnitine and creatine. More evidence is needed to clarify potential benefits<sup>(7)</sup>

## 2.4 Carbohydrate, sugar intake

- The sugar intake and its relationship to cancer is controversial. While few studies indicate no association, others indirectly indicate that it could impact recurrence and/or survival<sup>(29-35)</sup>.
- AICR/World Cancer Relief Fund (WCRF), recommends reduction of processed foods high in fat and starches. It also recommends limiting consumption of sugar sweetened drinks for cancer patients (<https://www.aicr.org/news/new-dietary-guidelines-committee-report-aligns-with-aicr-recommendations>)
- The International Agency for Research on Cancer (IARC) in its European Code Against Cancer recommends to reduce high fat foods, to restrict excess calorie consumption which may lead to excess body fat deposits, to prevent obesity related cancers. (<https://pubmed.ncbi.nlm.nih.gov/26164654/>).

### Recommendation

\* In patients with cancer, the carbohydrate and fat intake should be based on degree of physical activity, nutritional status, severity of malnutrition, stage of cancer, co-morbidities and other metabolic abnormalities.

\*Dietary intake of carbohydrates and fat should be adjusted in patients with relevant co-morbidities, obesity and risk of developing lifestyle associated non communicable diseases, including cancer.

## 2.5 Fibre

### Recommendations

Fibre intake is advised to be approximately equal to Recommended Dietary Allowances (RDA) (40gs/2000Kcal/day)

- The intake of dietary fibre has been associated with reducing the risk of mortality in patients with colorectal cancer in at least one study. High intake of fiber after diagnosis was associated with lower mortality. The multivariable HR per each 5-g increment in intake per day was 0.78 (95% CI, 0.65-0.93; P =0.006 for CRC-specific mortality and 0.86 (95% CL, 0.79-0.93; P < .001) for all-cause mortality)<sup>(36)</sup>.
- In Asian patients, fibre intake are likely to have protective effect in reducing the risk of CRC.<sup>(37)</sup>

## 2.6 Antioxidant supplementation

- Antioxidant supplementation during chemotherapy may improve therapeutic efficiency and prolong sur-

### Recommendations

There are insufficient data to recommend routine use of antioxidant supplementation

vival rates in patients; however, there is no conclusive evidence. There is also a potential risk that anti-oxidant supplements might interfere with effect of chemotherapy or radiotherapy treatment<sup>(38)</sup>

- In a clinical study of 2223 postmenopausal women with breast cancer, it was found that antioxidant supplementation worsened breast cancer prognosis<sup>(39)</sup>.

## 2.7 Probiotic supplementation

### Recommendation

There are insufficient data to recommend routine use of probiotic supplementation in management of radiation induced diarrhoea.

- There's limited data showing protective effects of probiotics with no safety evaluation
  - Probiotic supplementation helps in reducing the risk of side effects during cancer treatment such as radiation-induced diarrhoea<sup>(40,41)</sup>.
  - The use of probiotic supplements significantly helps in reducing the dose of anti-diarrhoeal treatment<sup>(40)</sup>
  - Probiotic use also assists in managing colorectal cancer; however, the probiotic strains that can have this benefit must be identified by the clinician<sup>(42)</sup>
- Increased diversity of the intestinal microbiome has been significantly associated with lower mortality after hematopoietic stem cell transplant (HSCT)<sup>(43)</sup>

### Recommendation for various types of nutritional interventions

\* Nutritional support is indicated when the patient is not able to eat food for 1 week or more, or also if less than 60% intake of their needs for more than 1-2 weeks.

\* In weight losing cancer patients with insulin resistance, it is recommended to increase the ratio of energy from fat as compared to carbohydrates.

\* It is recommended to choose complex carbohydrates, over simple carbohydrates in patients with cancer.

\* When carbohydrates and saturated fats are reduced, there should be corresponding increase in intake of proteins, fibres, and micronutrients.

\* While increasing the dose of proteins or micronutrients, it is not recommended to go beyond the recommended daily limits.

\* Dietary recommendations should not restrict energy intake in patient with or at risk of malnutrition.

## 2.8 Nutritional Supplements among Oncology patients

### Recommendation

\* Vitamins, minerals, and trace elements can be provided through diet or supplementation (in case of inadequate intake) approximately equal to the recommended daily allowance (RDA)

\* Random high dose of micronutrient supplementation is not recommended unless specific micronutrient deficiency is established.

\* If diet is inadequate, ONS can be provided after evaluating patient's nutrition status and food intake.

\* Referral to dedicated nutrition clinic should be considered as appropriate and when available.

\* Omega-3 fatty acids, Polyunsaturated Fatty Acids (PUFA) and high-protein diets may help in improving body weight in clinically malnourished patients.

- Due to cancer therapy side effects and inadequate dietary intake by many patients, the American Institute for Cancer Research (AICR), American Cancer Society (ACS)<sup>(19)</sup> and the European Society for Clinical Nutrition and Metabolism—(ESPEN)<sup>(13)</sup> support the use of a multivitamin-multimineral supplement in doses close to the recommended dietary allowance. High doses of vitamins and minerals are discouraged in the absence of specific deficiencies<sup>(13)</sup>
- Compared to no counselling, individualized dietary counselling showed significant benefits on nutritional status and QOL ( $p < 0.05$ )<sup>(44)</sup>
- A prospective observational study with HNC patient during chemo-radiotherapy recommend initiating nutritional counselling in conjunction with prophylactic ONS prescription from diagnosis to adjust the nutrient intake and minimize weight loss<sup>(45)</sup>
- ONS has a lower impact in overcoming nutritional deficiencies in cancer patients when provided orally than via enteral nutrition<sup>(46)</sup>
- A meta-analysis of 11 clinical studies indicated that high-protein, omega-3, and PUFA enriched diets have an overall benefit of increasing the bodyweight of patients receiving chemoradiotherapy compared with other types of diets. However, the impact on the reduction of treatment toxicity and survival is limited<sup>(47)</sup>
- Some clinical studies have proven that the use of fish-derived, omega-3 polyunsaturated fatty acids (2 g/day) in individuals with advanced cancer receiving chemotherapy improve appetite, energy intake, body weight, muscle mass, and/or physical activity. Given its clinical safety, fish oil can be suggested for malnourished patients with advanced cancer receiving chemotherapy<sup>(48)</sup>

- A meta-analysis comprised of 40 randomized clinical trial (RCT) mentioned that vitamin D supplementation with or without calcium did not reduce the skeletal or non-skeletal outcomes by more than 15% in unselected community-dwelling individuals<sup>(49)</sup>
- In a large scale RCT comprising 14,641 US male physicians, combined supplementation with vitamin E (400 IU/day) and vitamin C (500 mg/day) for 10 years had no long-term effects on reducing the risk of cancer.<sup>(50)</sup>
- Similarly, long-term supplementation with vitamin E (400 IU/day) and selenium (200 mg from selenomethionine) did not have a beneficial effect on the incidence of prostate cancer<sup>(51)</sup>

## 3. Types of nutritional interventions

Different types of cancer or their locations display different nutrition patterns leads to tailored nutritional therapy<sup>(7)</sup>. Appropriate nutrition may attenuate symptom burden, improve cancer status, and support cancer survivorship. Nutritional intervention varies according to patients' medical history, type, and stage of cancer as well as treatment response. If patient has functional gastrointestinal tract and can eat well then nutritional counselling (including oral nutritional supplements) is the prime importance as the first intervention to enhance oral intake to manage malnourished cancer patients. In non-hospitalised patients there are several advantages of home enteral therapy for the improvement of treatment side effects and improving weight benefits and their energy level. Early enteral nutritional therapy reduces the risk of weight loss and malnutrition when compared with oral feeding. In patients suffering with colon cancer, diet rich in protein, carbohydrates, fats, vitamins, and antioxidant help them to achieve caloric needs.

## 4. Specific interventions based on cancer treatment

Cancer treatments, chemotherapy, radiotherapy, surgery, hematopoietic stem cell transplantation or a combination of treatments, have their own nutritional challenges. A good nutrition during these therapies, may help patients to withstand treatment side effects, recover faster and can help in having better quality of life.

## 4.1 Surgery

Surgery being a major metabolic stress promotes loss of lean muscle mass, homeostatic instability, and the impairment of aerobic capacity. Full physical function after major surgery improved outcomes for cancer patients, thus allowing them to resume normal activities earlier. This has health economic benefits and potentially more efficient use of available hospital beds

### Recommendation

- \* Enhanced recovery after surgery (ERAS) program for cancer patients undergoing either curative, repeat or palliative surgery as appropriate.
- \* Appropriate preoperative nutritional support of 14 days (for poorly malnourished) or at least 5 days (for at risk or malnourished patients), even if surgery has to be postponed. Thereafter, nutritional support should continue both during hospitalization and post discharge from the hospital.
- \* Consider using oral/enteral immune-nutrition (arginine,  $\omega$ -3 fatty acids, nucleotides) for upper Gastrointestinal (GI) cancer patients in perioperative care if required.
- \* Immuno-nutrition may be indicated in malnourished HNC and GI cancer patients undergoing major cancer surgery.

- The ERAS program aims to decrease surgical stress, minimize catabolism, maintain nutritional status, improve glycemic control, reduce complications, optimize recovery, and decreases length of stay (LOS), making it both better and faster. As per ERAS protocol, appropriate patient should be screened for malnutrition, and if deemed at risk, they should be provided nutritional support<sup>(52)</sup>.
- In ERAS, the nutritional components avoid preoperative fasting, but encourage preoperative carbohydrate (maltodextrin) intake, oral feeding reestablishment on the first postoperative day, and early mobilization when appropriate<sup>(53)</sup>.
- Upper GI cancer patients managed within a traditional pattern of peri-operative care experienced a reduction in post-operative infective complications when given oral/enteral nutrition<sup>(54)</sup>
- The oral or enteral route should be considered for patients who are undergoing upper GI cancer surgery (where relevant), and consideration should be given to extending such support when the patient is discharged<sup>(53)</sup>.
- Perioperative Immuno-nutrition in abdominal surgery has the potential to reduce overall complications including infectious and also reduce LOS<sup>(55)</sup>

### Chemo-Radiation

The nutritional status of a cancer patient can potentially be affected by combined chemotherapy and radiation therapy.

Chemotherapeutic agents may cause anorexia, mucositis, nausea, vomiting and diarrhoea dependent upon dose and schedule administered. Similar side effects are observed with radiation therapy depending upon the dose, fractionation and volume of the tissue being irradiated. If combined, nutritional consequences have the potential to be exaggerated

## 4.2 Radiotherapy

### Recommendation

- \* Nutritional assessment with individualized nutritional counselling is recommended to appropriate patients undergoing radiation of the gastrointestinal tract or head and neck region.
- \* If nutritional support is required, this should be initiated early and if energy intake is inadequate, ONS and/or enteral nutrition (EN) can be offered.
- \* Maintaining swallowing function during EN can be facilitated by patient education material.
- \* PN is not generally recommended in radiotherapy. It may be used if sufficient oral/enteral nutrition cannot be provided, e.g., in severe radiation enteritis or severe malabsorption

- During scheduled radiation therapy (RT), individualized nutritional counselling and/or ONS has the potential to improve nutritional intake, body weight, and QoL in selected patients<sup>(56)</sup>
- ONS and EN recommended if total energy intake is inadequate, just like for patients with other illnesses<sup>(57)</sup>

## 4.3 Chemotherapy

### Recommendation

- \* Patients receiving conventional chemotherapy have a higher nutritional requirement.
- \* Supplementation with long-chain  $\omega$ -3 fatty acids or fish oil during chemotherapy in weight loss or malnourished cancer patients can help to stabilize or improve appetite, food intake, lean body mass, and body weight in selected individuals.

- Long-chain  $\omega$ -3 fatty acids reported beneficial effects for conservation of body composition in weight-losing cancer patients during chemo and/or radiotherapy<sup>(58)</sup>
- Fish oil may have protective effects on chemotherapy-induced toxicities like peripheral neuropathy<sup>(59)</sup>

#### 4.4 High-dose Chemotherapy and Hematopoietic stem cell transplantation (HSCT)

##### Recommendation

- \* EN and/or PN is commonly used and is part of SOP for most patients undergoing High-dose Chemotherapy and Hematopoietic stem cell transplantation.
- \* If oral nutrition is inadequate, PN is preferred unless there is severe mucositis, intractable vomiting, ileus, severe malabsorption, protracted diarrhea or symptomatic gastrointestinal graft versus host disease. (GVHD)
- \* In other cases where oral/EN is insufficient PN can benefit
- \* It is preferable to follow the neutropenic diet in Indian context for infection Control

#### 4.5 Cancer Survivors

##### Recommendation

- \* Regular physical activity and diet to maintain a healthy lifestyle
- \* Maintain a healthy weight (BMI of 18.5-22.9 kg/m<sup>2</sup>)
- \* Adopt a healthy lifestyle by following a diet based on vegetables, fruits, whole grains and diet low in processed foods, refined sugar, saturated fat, red meat and limit alcohol intake.
- \* In selected patients with specific requirements, personalized nutritional therapy may offer benefit

- Physical activity improves aerobic capacity, physical fitness, and function in cancer survivors<sup>(60,61)</sup>.
- The two risk factors, obesity and metabolic syndrome are designated for breast and gastric cancer patients, as they may increase the chance of recurrence<sup>(62)</sup>
- American Institute for Cancer Research's (AICR) health guides focuses on nutrition as well as lifestyle modification for prevention, treatment, and survival of cancer.

#### 4.6 Nutrition in Palliation

The objective of the nutritional support changes in palliative care as the disease progresses. In the early stages the main goal is to provide sufficient nutrition to restore nutritional status of the patients and towards end of life, emphasis is on quality of life and relief of suffering rather than active nutritional therapy.<sup>(63)</sup>

Palliative care requires sound understanding of the ethical and legal issues involved in decision-making related to nutrition and its administration so as to minimize the patient difficulties and enhance the quality of life.<sup>(63)</sup>

##### Recommendation

- \* Routinely screen patients with advanced cancer if they have inadequate nutritional intake because it has the potential to impact performance status and quality of life.
- \* As and when necessary, discussion about goals of care, patients and caregivers' preference and expectations from interventions should be offered where available.
- \* Discussion and decision should include routes, frequency and composition of nutritional intake (oral, enteral, parenteral).
- \* In dying patient's nutrition and hydration is limited to help in providing comfort care.

#### 5. Role of the multidisciplinary team (MDT) in cancer care

A role of multidisciplinary team (MDT) in oncology is well established. The medical oncologist, radiation oncologist, Surgical oncologist, Pathologists and Radiologists are key members of such MDT. Where available and as appropriate on case to case basis the MDT can also include one or more of the following : specialized nurses, pharmacists, dietitians, speech swallowing therapist, occupational therapists, psychologists specific to oncology, social workers, geriatricians specific to oncology.

##### Examples of how such case to case addition to the MDT can help in selected patients include :

1. Regular or an increased level of physical activity needs to be incorporated to support muscle mass, physical function, and metabolic pattern.
2. In addition to aerobic exercise, individualized resistance exercise to maintain muscle strength and muscle mass.
3. In the presence of dysphagia especially in patients with cancers of the upper aero-digestive tract, pre and post surgical speech and language pathology (SLP) expert evaluations are recommended.
4. In view of psychological distress, consider referral to psycho-oncology for evidence based psychological intervention to provide emotional support to patient and caregiver and to improve nutritional compliance with behavioural measures and structured cognitive and behavioural interventions.
5. Patients with Trismus, especially patients with submucous fibrosis during radiation, should regularly be evaluated by an occupational therapist and physiotherapist to retain jaw movement.

There's a lack of clinical and translational research integrating MDTs. However, the committee felt that MDTs can contribute for a better cancer care and need to evaluate its role in cancer care in Indian scenario. The experts agreed to suggest the role of MDT can be explored and implemented in the cancer centres wherever it is possible.

### Recommendation

\* The medical oncologist, radiation oncologist, Surgical oncologist, Pathologists and Radiologists are key members of the MDT for cancer patients.

\* As appropriate, when available and on case to case basis, the MDT can also include nurses, dietitians, psychologists, physiotherapist, occupational therapist and speech swallow therapist (For HNC patients) to determine patients' treatment plan.

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## 6. Conclusion

Malnutrition is a major issue in many cancer patients across India. It has the potential to impact tolerance to therapy, side effects and the overall outcome. Nutrition-risk screening and nutrition counselling are an integral component of the options in the management of cancer patients. We cannot allow nutrition depletion, cachexia, decreased functional capacity, chemotherapy toxicities, and hospitalization to jeopardize the well being of cancer patients. Individuals should be offered dietary counselling and nutritional interventions when appropriate. In hospitalised cases, enteral nutrition is recommended in patients whose oral intake does not meet their daily requirements. Early enteral nutritional therapy reduces the risk of malnutrition and associated risks, when compared with oral feeding. A balanced diet rich in protein, phytonutrients, fibre, antioxidants and less in saturated fats and refined sugars is appropriate to achieve caloric needs. A multi-disciplinary team addressing needs of cancer patients has several facets. On a case to case basis, it should also include nutritional care exercise training, psychosocial support (to handle anxiety and depression) as well as speech and language experts. Such initiatives have the potential to increase the quality of life and overall therapeutic success.

## Abbreviations

ACS: American Cancer Society, AICR: American Institute of Cancer Research, ASPEN: American Society for Par-

enteral and Enteral Nutrition, BIA: Bioimpedance analysis, BMI: Body mass index, CRP: Serum C-reactive protein, DEXA: Dual X-ray absorptiometry, ECOG: Eastern cooperative oncology group, EPIC: European Prospective Investigation into Cancer and Nutrition, ERAS: Enhanced recovery after surgery, ESMO: European Society for Medical Oncology, ESPEN: European Society for Clinical Nutrition and Metabolism, GI: Gastrointestinal, HNC: Head and neck Cancer, ICMJE: International Committee of Medical Journal Editors, ICMR: Indian Council of Medical Research, IU: International unit, MDT: Multidisciplinary team, NCCN: National comprehensive cancer network, PG-SGA: Patient generated Subjective Global Assessment scale, PUFAPolyunsaturated fatty acid, QOL: Quality of life, RCT: Randomised controlled trial, REE: Resting energy expenditure, RFS: Refeeding syndrome, SSB: Sugar-sweetened Beverage, TL: Total laryngectomy, WCRF: World Cancer Research Fund, HBNI: Homi Bhabha National Institute

## Disclaimer

Due to lack of Indian data, the evidences and guidelines considered while framing the consensus are of international and mainly western countries publications. We advise the practitioners to read the reference guidelines and research publications, before adopting our consensus in their practice. IAPEN India, make no warranties of any kind whatsoever regarding the recommendations and its application.

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