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Review Article

Oncology Nutrition Guidelines: From Clinician Limitations to Biologist-Nutritionist–Led Patient Implementation Tools

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This conceptual review synthesizes major international and Italian oncology nutrition guidelines (ESPEN 2017/2021, ASCO 2022, ASPEN 2016, SEOM 2021, AIOM 2025) to derive tumor- and phase-specific protocols and identify critical implementation gaps. Current guidance provides robust clinician algorithms for nutritional risk screening using NRS-2002, PG-SGA, or MUST, alongside energy targets of 25–30 kcal/kg ideal body weight, protein recommendations of 1–1.5 g/kg (up to 2 g/kg in high-risk patients), and structured escalation from oral nutritional supplements (ONS) to enteral nutrition (EN) when oral intake falls below 50–60% of requirements for over seven days. However, these guidelines remain largely tumor-agnostic, offer limited phase-of-care differentiation, and do not include validated patient-facing implementation tools, despite hospitalized cancer patients consistently demonstrating low nutritional knowledge with pass rates around 50–60% in knowledge assessments. Studies show that patients obtain nutrition information from heterogeneous sources (health professionals, family and friends, the internet), with specialist nutritional input often limited and concerns about misinformation widespread. A recent Qeios review further highlighted critically low nutritional literacy among hospitalized cancer patients and documented that oncologists, family doctors, and nurses themselves may have knowledge gaps that limit effective nutrition counseling. Building on this evidence base of guidelines and literacy, this review proposes a hybrid framework that (1) analyzes the strengths and limitations of existing clinician guidelines, (2) develops granular tumor- and phase-specific protocols for six high-nutritional-impact malignancies (pancreatic, head and neck, colorectal, lung, upper gastrointestinal, and hematologic) with a detailed pancreatic module and an illustrative head and neck texture-management example informed by ESPEN/ASCO/AIOM/ASPEN/SEOM recommendations, and (3) pairs these with prototype patient

implementation tools designed to address documented literacy deficits. A detailed pancreatic cancer module illustrates the integration of clinician decision trees with energy-dense "rescue meals," omega-3 protocols, and QR-linked digital resources. A head and neck cancer (HNC) module demonstrates texture progression planning alongside prophylactic percutaneous endoscopic gastrostomy (PEG) indications. Finally, the review outlines a literacy assessment prototype inspired by existing oncology nutrition literacy instruments and proposes a future randomized trial to test this hybrid model against standard leaflet-based education.

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1. Introduction

Cancer represents a metabolic emergency characterized by hypermetabolism, insulin resistance, and inflammatory cachexia affecting 40–80% of patients depending on tumor type and disease phase. These alterations lead to malnutrition in 50% at diagnosis, rising to 80% in advanced disease, with direct negative impacts on treatment tolerance (chemotherapy dose reductions of 25–40%), quality of life (QoL), and survival (hazard ratio 1.8–2.5)[1][2][3][4].

Internationally, the European Society for Clinical Nutrition and Metabolism (ESPEN) guideline on nutrition in cancer patients (2017) and its 2021 practical update, together with the American Society of Clinical Oncology (ASCO) guideline on exercise, diet, and weight management during cancer treatment (2022), form the core reference for clinicians regarding nutritional screening, assessment, and intervention. ESPEN recommends universal nutritional risk screening (nutrition risk screening NRS-2002, malnutrition universal screening tool (MUST), or patient-generated subjective global assessment (PG-SGA)) from diagnosis and at regular intervals, energy provision at 25–30 kcal/kg ideal body weight, protein at 1–1.5 g/kg (up to 2 g/kg in selected high-risk patients), and a stepwise approach from counseling and oral nutritional supplements (ONS) to enteral and parenteral nutrition based on intake thresholds and clinical status (<50–60% of requirements for >7 days). ASCO complements this with guidance on integrating physical activity and plant-forward dietary patterns, emphasizing the avoidance of unproven restrictive diets during active treatment and the promotion of Mediterranean-type patterns in survivorship [1][5].

At the national level, the Italian AIOM (Associazione Italiana di Oncologia Medica) guideline "Il supporto nutrizionale nel paziente oncologico in terapia attiva" (2024–2025), produced with SINPE (Società Nazionale Pedagogisti ed Educatori), FAVO (Federazione Italiana delle Associazioni di Volontariato in Oncologia), SICO (Società Italiana di Chirurgia Oncologica), ASAND (Associazione Scientifica Alimentazione, Nutrizione e Dietetica), AIRO (Associazione Italiana di Ricerca Operativa), and FNOPI (Federazione Nazionale Ordini Professioni Infermieristiche), adapts ESPEN principles to the Italian context, emphasizing NRS-2002 screening, the integration of nutrition into regional oncologic networks (Reti Oncologiche Regionali), and the inclusion of sarcopenia evaluation. Yet even with this evolving framework, implementation remains incomplete[6].

In this manuscript, the term 'nutritionist biologist' refers to the Italian professional figure (biologo nutrizionista) with responsibility for oncology nutrition assessment and counseling; where international guidelines refer to 'dietitians', these roles are considered analogous in scope for the purposes of implementation.

Knowledge-attitudes-practices (KAP) studies reveal that hospitalized cancer patients possess critically low nutritional knowledge, with average pass rates of 52–61% across assessment tools. Head and neck cancer patients score lowest (58%), followed by those with gastrointestinal malignancies (52%). Studies reveal mixed patterns in information-seeking: while some surveys show healthcare professionals as primary sources (70.9% in a German cohort), specialist nutritional consultation rates remain low (34.1% in Irish oncology patients), with patients heavily relying on family, friends, and internet searches alongside professional advice. Concerns about conflicting information and misinformation are widespread[1][7][8][9][10].

A Qeios review of hospitalized cancer patients' nutritional knowledge further showed that patients, oncologists, general practitioners, and nurses all demonstrate important gaps in evidence-based oncology nutrition, limiting the quality and consistency of counseling. These findings underscore the need for integrated oncology teams in which nutrition specialists (nutritionist biologists) work alongside oncologists, surgeons, and nurses to translate guideline recommendations into everyday practice and to support patients in achieving adequate intake. [8].

Objective: This manuscript conducts a guidelines-based conceptual review to (1) map the content and limitations of major international and Italian oncology nutrition guidelines and position papers; (2) propose tumor- and phase-specific protocols for six high-nutritional-impact malignancies—pancreatic, head and neck, colorectal, lung, upper gastrointestinal, and hematologic cancers—with worked

pancreatic and head and neck examples based on this synthesis; and (3) develop prototype clinician and patient tools, including a literacy assessment and an outline for a future randomized trial, to bridge the guideline–implementation gap.

2. Current Clinician Guidelines: Strengths and Limitations

2.1. Guideline Landscape

ESPEN's 2017 guideline and 2021 practical update on clinical nutrition in cancer provide 40+ recommendations covering screening, assessment, energy and protein targets, and escalation algorithms. Key elements include:

- **Screening**: NRS-2002 (sensitivity ~80–85%) or equivalent from diagnosis and at least weekly in inpatients[1].

- **Assessment**: Detailed PG-SGA for high-risk patients, incorporating weight loss, dietary intake, nutrition-impact symptoms, and functional status.

- **Targets**: 25–30 kcal/kg ideal body weight (IBW) in most patients, with up to 30–35 kcal/kg in prehabilitation or severe catabolism; protein at 1–1.5 g/kg (up to 2 g/kg in sarcopenic/high-risk settings); lipids ~30% of total energy, with omega-3 enrichment considered in cachexia[1].

- **Intervention algorithm**: Nutritional counseling and ONS (400–600 kcal/day) for patients with inadequate intake, escalation to enteral nutrition (EN) when <50–60% of requirements is met for more than 7 days, and parenteral nutrition (PN) reserved for cases of non-functional gut or EN intolerance[1][11].

ASCO's 2022 guideline focuses on diet and physical activity, recommending a Mediterranean-style, plant-centered pattern, weight management, and combined exercise–nutrition approaches during and after treatment, while clearly advising against restrictive or fad diets during active therapy. ASPEN's guidance supports EN as first-line in critically ill and onco-hematologic patients, with PN for those with severe gastrointestinal dysfunction, and emphasizes individualization of medical nutrition therapy in hematologic malignancies and hematopoietic stem cell transplantation (HSCT). SEOM's 2021 guideline provides practical recommendations for supportive nutrition in Spanish oncology practice, including prophylactic PEG and intensified protein support in head and neck cancer. AIOM 2024-2025 adapts these international recommendations for the Italian system, embedding nutrition support into percorsi

diagnostici-terapeutici assistenziali (PDTA) and highlighting the role of regional oncology networks. [5]
[6][12][13][14]

Guideline	Screening Tool	Energy Target	Protein	Escalation Criteria	Patient Component
ESPEN 2021	NRS-2002/PG-SGA	25–30 kcal/kg IBW	1–1.5 g/kg (up to 2 g/kg high risk)	<50–60% intake of requirements for >7 days → ONS → EN → PN	None structured; general recommendation for counseling, no standardized materials
ASCO 2022	Clinical judgment (no formal tool specified)	No specific kcal/kg; Mediterranean, plant-centered pattern	Not specified (ensure adequate intake)	Symptom- and risk-driven referral to nutrition services	Lifestyle and behavior-change advice on diet, activity, and weight management
ASPEN 2016	NRS-2002, NUTRIC score (The Nutrition Risk in Critically Ill), or local tools in ICU/hematology	~25–30 kcal/kg in critical illness (individualized)	1.2–2.0 g/kg (higher in critical/HSCT)	EN as first-line; PN when EN not feasible or insufficient, especially in severe GI dysfunction	Limited explicit patient education; focus on ICU and HSCT medical nutrition protocols
SEOM 2021	NRS-2002 recommended	25–30 kcal/kg (similar to ESPEN)	1.2–2.0 g/kg; up to 2 g/kg in head & neck cancer	ONS → EN → PN following ESPEN-like algorithm, with specific attention to RT-related dysphagia	Practical recommendations for supportive nutrition; mentions prophylactic PEG and intensified protein support in HNC
AIOM 2025	NRS-2002 ± PG-SGA	~32 kcal/kg IBW in active therapy	1.5–2.0 g/kg	ONS → EN when oral intake <60% of estimated needs; PN reserved for EN failure	Focus on integration into PDTA and Reti Oncologiche Regionali; information booklets and recommendations

Guideline	Screening Tool	Energy Target	Protein	Escalation Criteria	Patient Component
					for structured counseling

Table 1. Major oncology nutrition guidelines and their core recommendations. Summary of international (ESPEN, ASCO, ASPEN, SEOM) and Italian (AIOM) guidance on screening, targets, escalation, and patient components.

2.2. Critical Limitations

Despite their strengths, several limitations emerge when these guidelines are compared systematically:

Design gaps: An analysis by the Exercise and Nutrition Interventions to Improve Cancer Treatment-Related Outcomes (ENICTO) consortium showed that oncology nutrition trials are often underpowered, use heterogeneous endpoints (weight, muscle, recommended dietary intakes (RDI), QoL), and rarely treat nutritional outcomes as primary, limiting the strength of evidence underlying some recommendations. [2][4]

Granularity deficits: Guidelines typically classify risk by broad categories (e.g., "upper GI," "head and neck," "pancreas") and disease stage but seldom provide explicit, phase-of-care algorithms for specific tumors (e.g., pancreatic EN Day+1, head and neck cancer (HNC) texture progression plans, HSCT mucositis pathways), despite very different symptom profiles and nutrition-impact trajectories. [1][4]

Phase-of-care differentiation: While ESPEN and ASCO discuss perioperative, active treatment, and survivorship phases, few documents provide a structured 4-5 phase continuum (prehabilitation, perioperative, active systemic therapy, early recovery, long-term survivorship/palliation) with explicit nutritional targets and triggers for escalation or de-escalation.

Patient implementation chasm: No major guideline currently integrates nutritional literacy screening or tiered patient education materials into its algorithm, even though systematic reviews and meta-analyses in chronic disease and oncology show that structured nutrition counseling can increase energy and protein intake and modestly improve adherence and QoL.[8][15][16]

This conceptual review therefore aims to extend guideline content into tumor- and phase-specific clinician decision trees and prototype patient tools.

3. Patient Literacy Crisis: KAP Evidence and Misconceptions

KAP studies and literacy-focused work consistently show that most cancer patients have inadequate knowledge of evidence-based nutrition during treatment. Cross-sectional surveys in gastrointestinal cancers report overall knowledge pass rates around 52-60%, with major gaps in recognizing increased energy and protein needs and the role of nutrition in treatment tolerance. Similar deficits have been reported in lung cancer and mixed oncology cohorts, where fewer than 60% of patients correctly identify basic nutritional recommendations.[9]

A recent Qeios review of hospitalized cancer inpatients found low overall nutritional knowledge, a high prevalence of misconceptions, and reliance on informal sources such as elders, fellow patients, and unsystematic internet searches, while also noting that health professionals involved in oncology care (oncologists, general practitioners, nurses) demonstrate inconsistent familiarity with current nutrition guidelines. This combination of limited patient literacy and variable professional knowledge creates a structurally weak foundation for nutrition implementation.[8]

Common misconceptions (Table 2) directly undermine guideline adherence: Patients frequently believe that "protein intake feeds cancer growth" despite evidence that adequate protein (1.5-2.0 g/kg) preserves lean mass and treatment tolerance during therapy[17][18]. During chemotherapy and radiotherapy, routine patient advice to follow low-fiber diets persists despite a lack of evidence and data showing soluble fiber may improve gastrointestinal tolerance[19]. In pancreatic cancer, the widespread myth that "all dietary fat should be avoided" leads to inadequate calorie intake, even though medium-chain triglycerides (MCT) and enzyme replacement enable appropriate fat utilization for energy needs[20][21]. These beliefs contribute to oral nutritional supplement rejection rates exceeding 50% and sabotage structured nutrition interventions. Thus, even well-designed clinician algorithms risk failing at the patient interface when literacy is low, myths are entrenched, and behavioral support is inadequate.

To address these issues, this review proposes a hybrid clinician–patient framework (Section 4) and tumor-specific modules (Sections 5-6), alongside a literacy assessment prototype and future validation agenda (Section 7).

Tumor-specific myths:

Tumor Type	Myth (% endorsement)	Evidence-Based Fact
Pancreatic	"Avoid all fats" (68%)	MCT fats essential for 30-40% of calories
Head/Neck	"RT requires liquid-only" (62%)	Texture progression preserves intake
Colorectal	"Chemo needs low-fiber" (55%)	Soluble fiber prevents constipation

Table 2. Prevalent Misconceptions

These gaps explain guideline failure: patients reject ONS ("unnatural"), avoid protein ("feeds tumor"), and ignore symptom strategies. Validated literacy tools are scarce; most are cancer-specific, lacking universality[22][23].

4. Hybrid Framework: Clinician + Patient Dyad

The framework is built around six high-nutritional-impact malignancies—pancreatic, head and neck, colorectal, lung, upper gastrointestinal, and hematologic cancers—selected based on high malnutrition prevalence (often >50%) and Italian/European epidemiology. Hematologic malignancies are included because conditioning regimens, hematopoietic stem cell transplantation (HSCT), prolonged hospitalizations, mucositis, and chronic graft-versus-host disease (GvHD) create a distinctive profile of severe nutrition-impact symptoms and a high risk of lean mass loss, as recognized in ASPEN and HSCT-focused literature[1][4][6][11][13][14][24][25].

Across these six tumors, the framework organizes care into five phases: (1) prehabilitation, (2) perioperative/intensive treatment initiation (e.g., surgery, HSCT), (3) active systemic treatment (chemo, radio, immunotherapy), (4) post-treatment early recovery, and (5) longer-term survivorship or palliation. For each phase and tumor, guideline targets (e.g., 30-35 kcal/kg in prehabilitation, 1.5-2.0 g/kg protein in high-risk settings) are combined with decision thresholds (e.g., NRS-2002 $\geq$3, PG-SGA high risk, intake <60% of needs) to generate clinician algorithms. [2].

Care Phase	Clinician Protocol (ESPEN/ASCO/AIOM/ASPEN/SEOM synthesis derived)	Patient Tool (Literacy-tiered) prototypes to be tested and adapted
Prehabilitation	35 kcal/kg IBW, 2 g/kg protein, immunonutrition start	"3-week power-up meal plan" infographic + recipes
Perioperative	EN Day +1 (1.5 kcal/ml), refeeding monitoring	"Day 1-7 texture progression guide"
Active Treatment	ONS 400-600 kcal + ω-3 2 g EPA/DHA	"Symptom rescue foods list" (5 options/tumor)
Post-treatment	Protein timing 30 g/meal, BIA monthly	"Muscle rebuild calendar" visual tracker
Survivorship	Mediterranean pattern, annual screening	"Cancer-free plate composition" method

Table 3. Dual Framework Template

The key innovation is explicitly pairing each clinician algorithm with a corresponding patient-facing resource tailored to literacy level and tumor/phase context.

5. Pancreatic Cancer Prototype

5.1. Rationale and Guideline Basis

Pancreatic ductal adenocarcinoma (PDAC) has one of the highest rates of cancer-related malnutrition and cachexia, with studies indicating that up to 80-90% of patients are malnourished at diagnosis or during the disease course. ESPEN and surgical nutrition guidelines, as well as pancreatitis/chronic pancreatitis recommendations, endorse early enteral nutrition (EN Day +1), energy-dense feeding, pancreatic enzyme supplementation, and attention to steatorrhea and diarrhea. Expert statements on implementing pancreatic nutrition pathways similarly recommend proactive management of exocrine insufficiency, high-energy oral intake, ONS, and EN/PN when needed. [11][26][27][28][29].

5.2. Clinician Decision Tree

Guideline-based decision tree derived from ESPEN cancer and surgical nutrition guidelines, pancreatitis/chronic pancreatitis recommendations, and expert statements, illustrating one possible approach to screening, escalation from nutritional counseling/ONS to EN/PN, and management of diarrhea/steatorrhea. All thresholds (e.g., intake <40–50% of needs, grip strength decline) are intended as pragmatic cut-offs for this conceptual framework and require local adaptation and validation[1][11][27][29].

Pancreatic cancer patient

(at diagnosis / pre-op / post-op / during systemic therapy / follow-up)

→ Nutrition risk screening (NRS-2002 or MUST; weight loss, BMI, intake, ECOG)

→ At risk? (e.g., NRS-2002 ≥3 or MUST ≥1, WL >5%/1 mo or >10%/6 mo, BMI <18.5, intake <60% needs)

o → Brief nutritional counseling; re-screen every 4–8 weeks → (back to screening)

Yes → Comprehensive assessment

Estimate needs ~25–30 kcal/kg, 1.2–1.5 g protein/kg

Intake (24-h/3-day), PG-SGA, body composition (if available), handgrip strength

Symptoms: anorexia, nausea/vomiting, early satiety, pain, diarrhea/steatorrhea, bloating

Suspect Pancreatic Exocrine Insufficiency (PEI)? (surgery/atrophy, greasy stools, bloating, disproportionate

weight loss)

→ Oral intake and gut function

Adequate / mild deficit: ≥60–75% needs

Moderate deficit: 40–60% needs

Severe deficit / no intake: <40% needs or non-functional gut

→ If able to eat and intake ≥60–75% needs, symptoms manageable:

Nutritional counseling ± ONS

Energy-dense, fractionated meals; ONS if intake <100% needs

Optimize symptom control and PERT when PEI suspected

→ Re-assess after 1–2 weeks

If weight stable/improving, intake ≥75%, no major grip-strength decline →

Maintain plan; monitor every 4–8 weeks → (back to screening)

If ongoing weight loss, intake <75%, functional decline →

Intensify ONS and symptom/Pancreatic Enzyme Replacement Therapy (PERT) optimization; consider

EN if intake remains <60% needs

→ If intake <60% needs, expected inadequate intake >1 week, or non-functional gut:

Start enteral nutrition (EN)

Prefer EN to PN whenever gut is functional

Oral supplements first; if insufficient/not feasible → tube feeding (NG/PEG/PEJ)

Consider jejunal route after major pancreatic surgery or if gastric feeding not tolerated

→ After ~3–4 days of EN:

If ≥60–70% of targets achieved and tolerated → continue EN ± oral, monitor

If EN not feasible or cannot reach targets → start PN ± EN; monitor closely for complications

→ Diarrhea / steatorrhea branch (parallel):

If present → evaluate PEI and other causes

PEI likely → start/optimize PERT (dose and timing), consider Proton Pump Inhibitor (PPI), avoid excessive

fat restriction

If diarrhea persists or PEI unlikely → assess chemo-related, infectious, bile acid malabsorption, Small

Intestinal Bacterial Overgrowth (SIBO), high-osmolar ONS/EN; adjust formula/rate; symptomatic therapy; ensure

hydration

→ Perioperative notes (major pancreatic surgery):

Pre-op: screen; give ONS 7–14 days if malnourished; consider EN/PN in severe cases if surgery can be

delayed; integrate Enhanced Recovery After Surgery (ERAS)

Post-op: early oral feeding when feasible; start EN (prefer jejunal) if expected no/poor intake >5–7 days; PN

only when EN not possible or not tolerated

Monitoring and goals of care (applies to all stages):

- Regular re-screening and reassessment (weight, BMI, intake %, symptoms, grip strength, labs)
- Adjust route (counseling / ONS / EN / PN) according to disease trajectory and tolerance
- In advanced disease, align nutrition support intensity with prognosis and patient goals
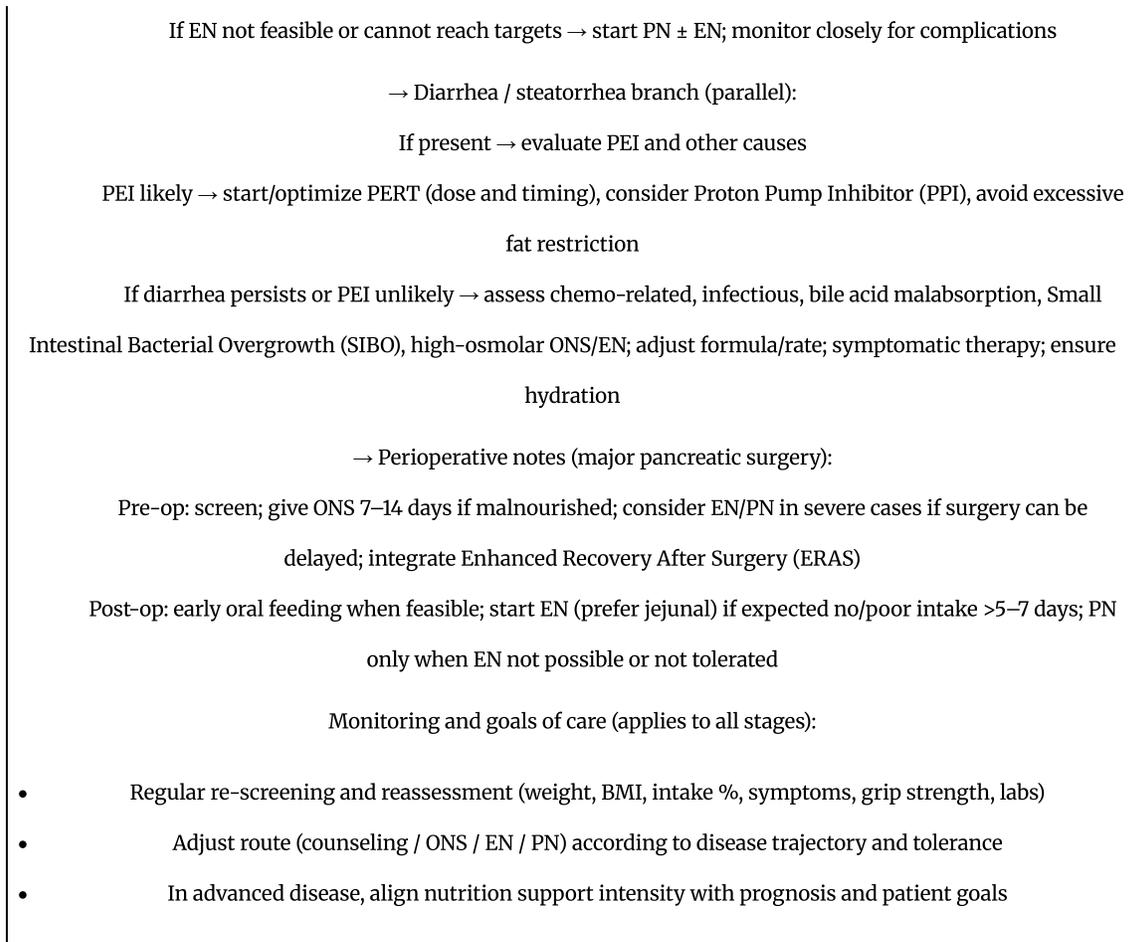
Figure 1. Proposed text-based clinician algorithm for pancreatic cancer nutritional management

Note: All thresholds (e.g., intake <40–50% vs ≥60–75% of needs, grip-strength decline) are pragmatic cut-offs for this conceptual framework and require local adaptation and validation in line with ESPEN cancer and pancreas-related nutrition guidelines

5.3. Patient-facing weekly nutrition rescue plan (prototype)

PANCREATIC CANCER − WEEKLY NUTRITION RESCUE PLAN

(for chemotherapy / radiotherapy / after surgery)

1.   DAILY TARGETS

- Aim for about 2000 calories per day.
- Aim for about 100 g of protein per day.
- Aim for formed stools (ideally ≤3 loose stools per day).

(Targets derived from cancer nutrition guidelines; adjust with your clinician.)

2.   RESCUE MEALS (CHOOSE AT LEAST 2 PER DAY)

Each option is an easy, energy–dense snack or small meal (about 400–600 kcal) using commonly tolerated foods:

- Option A: Protein shake with fruit, milk or lactose-free milk, protein powder, and a small amount of Medium-Chain Triglyceride (MCT) oil (high energy, high protein).
- Option B: Soft rice or pasta bowl with added fat (butter/oil) and finely chopped or pureed protein (e.g., chicken, fish, eggs).
- Option C: Salty snack plus cheese and a soft fruit or compote (e.g., pretzels/crackers, cheese, applesauce).
- Option D: Boiled or mashed potatoes with a creamy topping (e.g., yogurt/sour cream) and added protein powder.
- Option E: Soft oatmeal or porridge with nut butter and banana.

(Recipes and exact quantities can be adapted locally; focus on small portions with high energy and protein content.)

3.   PANCREATIC ENZYMES AND FATS

- Take pancreatic enzymes with every meal and snack that contains fat or protein (dose and timing as prescribed).
- Do not completely avoid fats: with the right enzyme dose, small amounts of fat are helpful for energy and weight maintenance.
- Ask your team if a small amount of MCT oil is appropriate for you (easier to absorb in some patients with malabsorption).

4.   WHEN TO CALL YOUR NUTRITIONIST / TEAM

Contact your nutritionist, biologist, or oncology team if any of these happen:

- More than 3 loose stools per day for 3 days in a row.
- Weight loss of 2 kg or more in one week.
- You cannot manage at least 2 rescue shakes/meals per day.

- New or worsening belly pain or cramping.
- Persistent nausea or vomiting that limits eating.

5.   EXTRA SUPPORT (QR CODES OR LINKS)

- Short video recipes showing how to prepare the rescue meals (Italian / English).
- Simple online symptom and stool diary (to track weight, intake, stools, pain).
- Contact numbers for the nutrition clinic and emergency support.

Figure 2. Text-based prototype of a patient-facing "weekly nutrition rescue plan" for pancreatic cancer during active treatment. Example of a text-based, literacy-sensitive handout combining simple daily targets (energy, protein, stool frequency), several energy-dense 400-600 kcal "rescue meals" using commonly tolerated foods, key pancreatic enzyme and MCT messages, clear criteria for contacting the nutritionist, and placeholders for QR codes linking to short video recipes, a symptom diary web form, and emergency contacts. Content is derived from ESPEN and pancreatic nutrition guidelines and patient resources but has not yet been formally tested or validated and should be adapted before clinical deployment.[3][11][20]

Note: Content is adapted from ESPEN cancer and pancreatitis nutrition recommendations and existing pancreatic cancer patient resources, but this is a prototype and has not yet been formally tested or validated; it should be adapted to local practice and literacy level before routine clinical use[1][30].

6. Head/Neck Cancer Module Preview

Head and neck cancers (HNC) carry a very high risk of malnutrition and treatment-related dysphagia, particularly during radiotherapy or chemoradiation. Guidelines from ESPEN, SEOM, and UK multidisciplinary groups support early nutrition assessment, prophylactic or early feeding tube placement in selected high-risk patients (for example, planned radiotherapy >4-6 weeks, expected severe dysphagia, T3–T4 disease), high protein targets (up to about 1.5-2.0 g/kg/day), and structured collaboration between nutrition and speech and language therapy services for texture management and swallowing exercises.[3][7][31][32].

Table 4 summarizes a conceptual four-band texture chart for dysphagia in head and neck cancer during radiotherapy. It is an illustrative, patient-facing framework that groups foods into four broad texture bands—thickened drinks/liquefied options, smooth purees, soft/moist easy-to-chew foods, and a gradual return toward more regular textures in survivorship—to support joint counseling by speech therapy and

nutrition services. Actual texture prescriptions and movement between levels must be individualized, may require moving up or down the texture bands according to swallowing status and treatment side effects, and should always follow formal dysphagia assessment and institutional practice; this is a simplified educational aid inspired by UK "food hierarchy" leaflets and ESPEN/SEOM recommendations and is not a substitute for IDDSI or clinical guidelines[1][3][7][33][34][35].

Texture band	When this band may be needed*	Example foods (to be adapted locally)	Key notes
Thickened drinks / liquefied options	When swallowing is most difficult or unsafe with thinner liquids or solid foods; early after severe mucositis or if instrumental assessment shows high aspiration risk.	Prescribed thickened drinks (water, tea, juice, oral nutritional supplements) at the thickness recommended by the speech therapist; smooth soups and liquefied meals with no lumps (for example, blended pasta or vegetables with extra sauce).	No chewing required; texture and thickness must follow your individual IDDSI prescription and local protocol; may be combined with tube feeding if oral intake is insufficient.
Smooth purees (protein-fortified)	When chewing is difficult or unsafe but a spoon-thick, lump–free texture is tolerated.	Smooth, lump–free blended meals (such as mashed potato enriched with milk/cream and protein, pureed meat or fish with sauce, pureed pulses); smooth yogurt-type desserts and pureed fruit without skins, pips, or bits.	Eaten with a spoon; no chewing needed; foods should be moist, not sticky, and with no separate thin liquid; dietitian can add extra protein and energy to reach targets.
Soft, moist, easy-to-chew foods	When some chewing is possible and safe but hard, dry, or crunchy foods remain difficult.	Soft pasta, well-cooked vegetables, minced or very tender meat in plenty of gravy or sauce; soft scrambled eggs, cottage cheese, fish in sauce, soaked bread or sandwiches dipped in soup.	Needs chewing but food should break up easily; avoid dry, crispy, crunchy, or crumbly textures; piece size and softness should follow local dysphagia guidance.
Toward more regular textures (survivorship goals)	During longer-term recovery, when swallowing has improved and assessments show that more solid textures are safe.	Gradual reintroduction of more typical foods, adapted to what you can chew and swallow safely (for example, softer versions of your usual meals, with extra moisture and sauces).	The aim is to return as close as possible to your usual diet, while maintaining high-protein, high-energy choices; changes must be guided by speech therapy and dietetics after formal review.

Table 4. Texture bands for dysphagia in head and neck cancer during radiotherapy (conceptual patient-facing chart). This is a simplified educational tool inspired by dysphagia diet frameworks and UK "food hierarchy" leaflets for radiotherapy patients; it does not replace the IDDSI classification or formal clinical guidelines, and texture prescriptions must always follow individual assessment and local protocols.

*Your nutritionist and speech therapist will decide which band is safest for you and when to move between them. Patients may need to move up or down the bands over the course of radiotherapy and recovery, depending on swallowing status and side effects[1][33].

7. Proposed Nutritional Literacy Assessment Prototype

Given the documented literacy gaps and the absence of a brief, universally accepted oncology–specific nutrition literacy screen, this review proposes a pragmatic 5-item prototype to rapidly stratify patients by basic understanding of treatment-relevant nutrition concepts. The multiple-choice questions are inspired by the structure of existing oncology nutrition literacy instruments (e.g., NLit-BCa in breast cancer and a nasopharyngeal carcinoma nutrition literacy scale), which have demonstrated feasibility and construct validity in specific tumor populations, but no claims are made regarding the psychometric validation of this new tool. At this stage, the 5-item screen should be considered hypothesis-generating and suitable for research use only; its reliability, validity, and responsiveness would need to be established in formal studies before routine clinical implementation. [22][23][36].

Universal 5-question screen (Day 1 administration, 2 minutes):

1. "During chemotherapy, should you eat more protein? (Yes/No)"
2. "For pancreatic cancer diarrhea, what's best? (a) Salad (b) White rice (c) Spicy curry)"
3. "If losing weight with cancer, your calorie target is? (a) Less (b) Same as healthy (c) More)"
4. "Omega–3 supplements help cancer patients by? (a) Shrinking tumors (b) Reducing inflammation (c) Don't know)"
5. "Call nutritionist if? (a) 1kg weight loss (b) Can't eat 50% meals 3 days (c) Mild nausea)"

Scoring: ≥3 correct → Tier 1 (infographics); <3 → Tier 2 (intensive counseling + video).

8. Proposed RCT and Validation Agenda

Based on evidence that individualized nutritional counseling and education can improve energy and protein intake, nutritional guideline adherence, and selected anthropometric and quality-of-life outcomes in cancer patients, we propose a future multicenter randomized controlled trial to test this hybrid pancreatic module. Approximately 240 pancreatic cancer patients would be randomized to: (Arm 1) standard care plus a generic nutrition leaflet, or (Arm 2) standard care plus the hybrid module (clinician algorithm, patient infographic with 400–600 kcal "rescue meals," and app-based symptom/intake diary). Primary endpoints would be improvement in nutritional knowledge scores (target relative increase ~25%) and adherence to energy/protein prescriptions or ONS (target relative increase ~15%) at 4 weeks, with secondary endpoints including weight stability, body composition where feasible, and EORTC QLQ-C30 nutrition-related domains. These effect size assumptions are informed by prior oncology nutrition counseling and education trials and would require confirmation in formal sample-size calculations. [15] [16][37].

9. Implementation Roadmap and Differentiation

Building on existing implementation roadmaps for oncology nutrition, this framework translates guideline recommendations into a minimal, time-stamped workflow that can be embedded in routine care. The example below illustrates how the hybrid model could be operationalized from admission through early follow-up[38][39]

Hospital workflow (example pathway)

- Admission Day 1 → Nutrition risk screen + brief handout + patient portal/app sign–up (~5 minutes).
- Week 1 → Nutritionist biologist consult (in–person or telehealth) + demonstration of patient tools (~15 minutes).
- Week 4 → Telehealth nutrition follow–up + adjustment of plan and tools (~10 minutes)[40][41].

Digital ecosystem (prototype concept):

- Progressive web app (PWA): Symptom and intake diary that generates tailored tips based on predefined rules (for example, flags for low intake, uncontrolled diarrhea, or weight loss)[42].

- QR codes integrated into handouts and clinic posters, linking to short videos/recipes, symptom diary, and hotline/telehealth access.
- Multilingual content (for example, Italian/English/Spanish/Arabic/Persian) to support migrant and minority populations.

Differentiation:

Feature	Current Materials	Hybrid Framework
Primary Audience	Clinicians only	Clinician + patient dyad
Specificity	Generic advice	Tumor-, phase-, symptom-specific modules
Literacy design	Text-heavy, single level	Tiered (icons and simple messages → more detailed text)
Evaluation	Little or no formal validation	Embedded pre/post knowledge and behavior testing protocol
Delivery	Static print materials	Print materials linked via QR to an app-based ecosystem (videos, diary, alerts)

Table 5. Current education materials versus proposed hybrid framework

10. Discussion and Future Directions

This guidelines-based hybrid model links the entire implementation chain: international and Italian clinician recommendations (ESPEN, ASCO, ASPEN, SEOM, AIOM) → tumor- and phase-specific protocols → patient literacy tools → behavioral adherence → nutritional and clinical outcomes. By explicitly pairing clinician algorithms with literacy-sensitive patient resources and a proposed assessment screen, it addresses the "last mile" where guidelines often fail—translation into day-to-day food choices, symptom management, and oral supplement use. Meta-analyses and interventional studies in oncology confirm that structured nutritional counseling and tailored education can increase energy and protein intake, improve adherence to nutritional prescriptions, and produce modest but clinically relevant gains in weight and quality of life, suggesting that oncology remains one of the largest underexploited areas for nutrition implementation[1][4][6][15][16][37].

In the survivorship phase, this framework can be aligned with the American Cancer Society guideline, which recommends a Mediterranean-style, plant-based eating pattern, maintenance of a healthy body weight, and regular physical activity for cancer survivors. While ESPEN, AIOM, ASPEN, and SEOM primarily guide nutritional support during diagnosis and active treatment, ACS adds a complementary survivorship perspective, reinforcing the need for continuity between treatment-phase nutrition protocols and long-term lifestyle counseling[1][6][12].

Several immediate priorities emerge from this conceptual work. First, a randomized controlled trial of the pancreatic module is needed to evaluate whether the hybrid approach (clinician decision tree plus infographic and app-based tools) improves nutritional knowledge, adherence to energy/protein or ONS prescriptions, and short-term clinical outcomes compared with standard leaflet-based education. Second, developing a core outcome set for oncology nutrition education—covering literacy, behavior change, intake, and patient-reported outcomes—would facilitate comparability across future studies. Third, national and regional adaptation, starting with Italian AIOM and Coordinamento dei Biologi Nutrizionisti, is required to embed these protocols into PDTA and Reti Oncologiche Regionali. Finally, health-economic analyses are needed to quantify whether improved adherence and earlier escalation (ONS/EN) translate into reduced malnutrition-related hospitalizations and overall cost savings, as suggested by data on the economic burden of hospital malnutrition[6][15][37].

Within the Italian context, AIRTUM epidemiology and guideline priorities justify an initial focus on pancreatic and head and neck cancers, given their high prevalence of malnutrition and cachexia, while hematologic malignancies and gastrointestinal tumors represent parallel high-impact targets. The proposed dual-guideline approach—one layer for clinicians, one for patients—offers a structured path to transform nutrition from "guidelines on paper" into "patient action in practice," but all components (algorithms, literacy screen, patient tools) should be regarded as prototypes requiring prospective validation and local adaptation before routine use[1][3][24].

11. Conclusions

This conceptual review demonstrates that while oncology nutrition guidelines provide solid clinician algorithms, their impact is limited by a tumor-agnostic design, lack of phase differentiation, and absence of validated patient tools. The proposed hybrid framework—tumor- and phase-specific protocols paired with literacy-tiered patient resources—offers a path toward closing the guideline–implementation gap.

Future work should prioritize randomized trials of the pancreatic module and psychometric validation of the literacy screen to establish clinical efficacy.

Abbreviations

- AIOM Associazione Italiana di Oncologia Medica

- AIRO Associazione Italiana di Ricerca Operativa

- ASAND Associazione Scientifica Alimentazione, Nutrizione e Dietetica

- ASCO American Society of Clinical Oncology

- ASPEN American Society for Parenteral and Enteral Nutrition

- BIA Bioelectrical Impedance Analysis

- EN Enteral Nutrition

- ENICTO Exercise and Nutrition Interventions to Improve Cancer Treatment–Related Outcomes

- ERT External Beam Radiotherapy

- FAVO Federazione Italiana Associazioni di Volontariato in Oncologia

- FNOPI Federazione Nazionale Ordini Professioni Infermieristiche

- GvHD Graft-versus-Host Disease

- HNC Head and Neck Cancer

- HSCT Hematopoietic Stem Cell Transplantation

- IBW Ideal Body Weight

- IDDSI International Dysphagia Diet Standardization Initiative

- KAP Knowledge, Attitudes, Practices

- MCT Medium–Chain Triglycerides

- MUST Malnutrition Universal Screening Tool

- NG Nasogastric

- NRS-2002 Nutritional Risk Screening 2002

- NUTRIC Score Nutrition Risk in Critically ill

- ONS Oral Nutritional Supplements

- PDTA Percorso Diagnostico-Terapeutico Assistenziale

- PEG Percutaneous Endoscopic Gastrostomy

- PEI Pancreatic Exocrine Insufficiency

- PEJ Percutaneous Endoscopic Jejunostomy

- PERT Pancreatic Enzyme Replacement Therapy

- PG–SGA Patient-Generated Subjective Global Assessment

- PN Parenteral Nutrition

- PPI Proton Pump Inhibitor

- PWA Progressive Web App

- QoL Quality of Life

- QR Quick Response (code)

- RDI Recommended Dietary Intakes

- RT Radiotherapy

- SEOM Sociedad Española de Oncología Médica

- SIBO Small Intestinal Bacterial Overgrowth

- SICO Società Italiana di Chirurgia Oncologica

- SINPE Società Italiana di Nutrizione Parenterale ed Enterale

- SLT Speech and Language Therapy

- TNM Tumor–Node–Metastasis

- T3–T4 Advanced primary tumor stages (TNM classification)

Statements and Declarations

Author Contributions

The author contributed fully to the conceptualization and methodology of the study, prepared the original draft, developed all visualizations, and completed the editing and final revisions.

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Declarations