

مراقبت های تغذیه ای در بیماران COPD

دکتر مهدیه پوریزدان پناه
پزشک و متخصص تغذیه (MD. Ph.D)



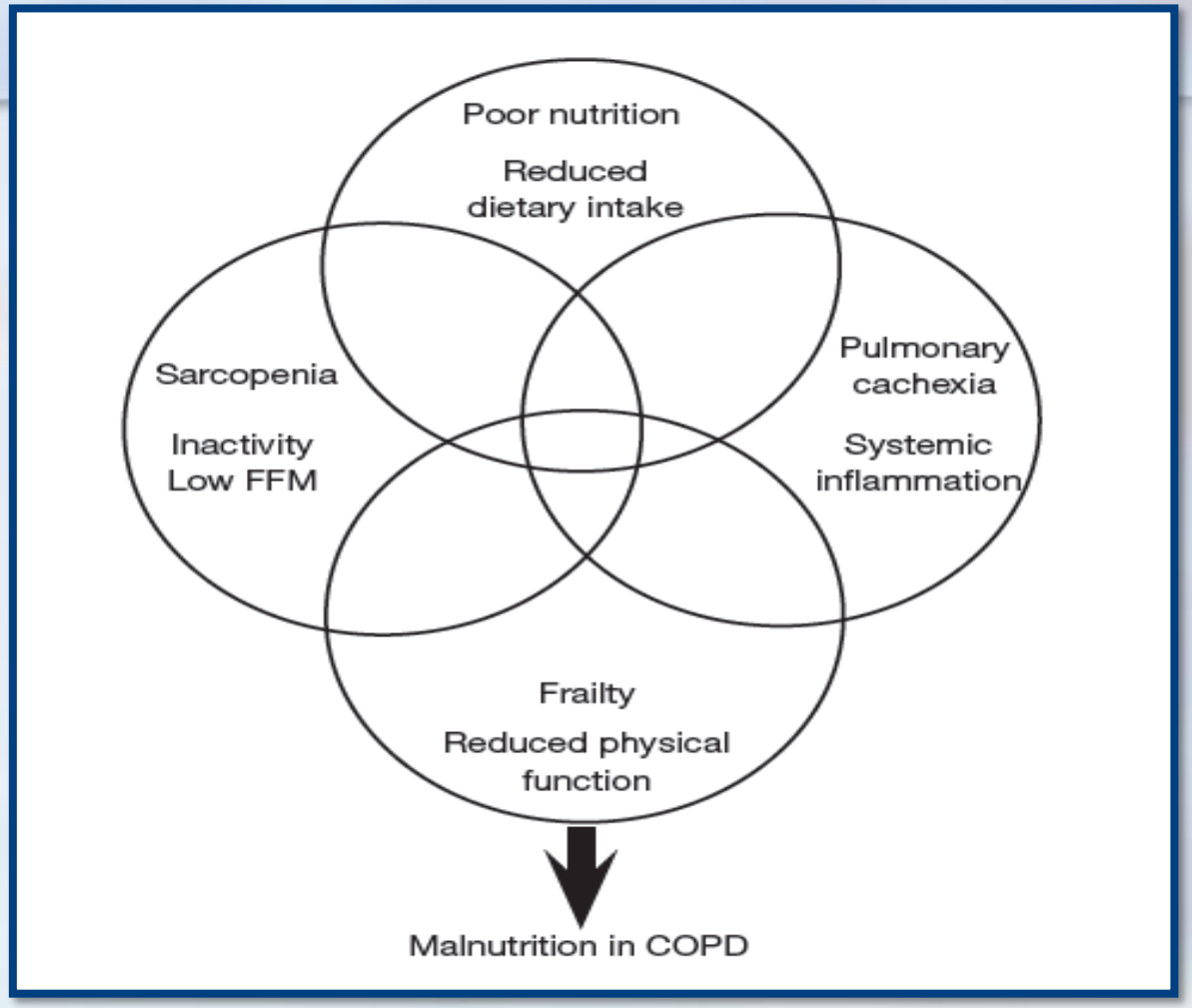
Prevalence

- The prevalence of weight loss in COPD has been reported in the range 25-50%
- Malnutrition is both a cause and consequence of severe respiratory disease



Weight loss phenotype in COPD

- It is frequently present in COPD and the clinical phenotype ranges from minimal or no weight loss with signs of muscle wasting, anorexia and inflammation, through to severe weight loss, significant muscle depletion (sarcopenia), fatigue and reduced physical performance (frailty)


Poor nutrition
Reduced dietary intake
Sarcopenia
Inactivity
Low FFM
Pulmonary cachexia
Systemic inflammation
Frailty
Reduced physical function
Malnutrition in COPD



Consequences of malnutrition in COPD

- Increased mortality
- Increased healthcare costs
- Longer hospital stays
- More frequent readmissions
- Reduced muscle strength
- Reduced respiratory muscle function



pulmonary cachexia

- Unintentional weight loss or a low BMI
- The presence of FFM depletion
- Anorexia
- Decreased muscle strength
- Fatigue
- Abnormal biochemistry (e.g., elevated CRP, IL-6, anaemia, hypoalbuminaemia)



Causes of malnutrition in COPD

Disease effects e.g. breathlessness, anorexia, inflammation

Psychological factors e.g. motivation, apathy, depression

Social factors e.g. social isolation, death of a partner, lack of practical support

Environmental factors e.g. living conditions, access to shops

Increased nutritional requirements e.g. energy, protein

Medication:
- inhaled therapy and oxygen therapy e.g. taste changes, dry mouth
- frequent or prolonged use of corticosteroids adversely affecting bone density, muscle mass (lean tissue)



Malnutrition in COPD

- Greater hyperinflation
- Poorer lung diffusing capacity
- Reduced exercise tolerance

when compared to non-malnourished patients with the disease



Malnutrition in COPD

- Malnutrition is likely to accelerate respiratory function decline, causing loss of lung tissue as well as a reduction in the size and contractility of the muscles associated with breathing, such as the diaphragm.
- In the presence of malnutrition, respiratory muscles become weaker and fatigue earlier, and this may impair the ability to generate sufficient cough pressure to effectively expectorate and clear the lung of secretions that may be infected.



Causes of weight loss and muscle wasting in COPD

- Weight loss in patients with COPD is typically associated with a loss of both FM and FFM stores
- Weight loss resulting in depletion of FM occurs when energy imbalance
- Muscle wasting is a consequence of negative nitrogen balance



FFM depletion in cachectic COPD patients

- Inflammatory markers such as TNF-α are known to reduce food intake
- Compromised nutritional intake
- increased protein breakdown can be accompanied with immobility and the need for corticosteroid medication



Traditional Ideal

- wasting was an adaptive response to the disease
- Nutritional support might even be detrimental with the provision of additional substrate, particularly in the form of carbohydrate, placing a further burden on the respiratory system.



Now, we know：

- Improved nutritional status was found to be associated with significant improvements in functional capacity, respiratory muscle strength and quality of life



Nutrition Support

- Improvements in respiratory (inspiratory and expiratory muscle strength) and non-respiratory (handgrip and quadriceps) muscle strength were associated with an increase in body weight of more than 2 kg (2.1–3.1 kg)
- Interestingly, this is the magnitude of weight gain (>2 kg over 8 weeks) in depleted COPD patients that has been found to be independently associated with improved survival at 4 years.



Medical nutrition therapy

BMI score

>20 kg/m²	Score 0
18.5 – 20 kg/m²	Score 1
<18.5 kg/m²	Score 2

Weight loss score

Unplanned weight loss score in past 3-6 months

<5%	Score 0
5 – 10%	Score 1
>10%	Score 2

Acute disease effect score

(unlikely to apply outside hospital)

If patient is acutely ill and there has been, or is likely to be, no nutritional intake for more than 5 days

Score 2

Total score 0-6

Low risk - score 0
Routine clinical care

- **Provide green leaflet:** 'Eating Well for your Lungs' to raise awareness of the importance of a healthy diet
- If BMI >30 (obese) treat according to local guidelines
- **Review / re-screen** annually.

Medium risk - score 1
Observe

- **Dietary advice** to maximise nutritional intake. Encourage small frequent meals and snacks, with high energy and protein food and fluids[43]
- **Provide yellow leaflet:** 'Improving Your Nutrition in COPD' to support dietary advice

NICE recommends[6] COPD patients with a BMI <20 kg/m^2 should be:
- prescribed oral nutritional supplements (ONS). See ONS pathway, page 9
- encouraged to exercise to augment the effects of nutritional supplementation

- **Review progress** after 1-3 months:
- if improving continue until 'low risk'
- if deteriorating, consider treating as 'high risk'.

High risk - score 2 or more
Treat**

- **Dietary advice** to maximise nutritional intake. Encourage small frequent meals and snacks, with high energy and protein food and fluids[43]
- **Provide red leaflet:** 'Nutrition Support in COPD' to support dietary advice
- **Prescribe oral nutritional supplements (ONS)** and monitor (see ONS pathway, page 9)
- **Review progress** according to ONS pathway, page 9
- On improvement, consider managing as 'medium risk'
- **Refer to dietitian** if no improvement or more specialist support is required.



Screening

- Routine nutritional risk screening with a validated screening tool should be performed in all COPD patients across all settings



Screening

BMI score		Weight loss score Unplanned weight loss score in past 3-6 months		Acute disease effect score *(unlikely to apply outside hospital)*
>20 kg/m²	Score 0	<5%	Score 0	If patient is acutely ill and there has been, or is likely to be, no nutritional intake for more than 5 days Score 2
18.5 – 20 kg/m²	Score 1	5 – 10%	Score 1	
<18.5 kg/m²	Score 2	>10%	Score 2	

Total score 0-6



Screening

- It should be noted that BMI alone will not identify all patients who are at risk of malnutrition as a high
- BMI can mask unintentional weight loss including loss of muscle mass (lean tissue)



Screening

- Mid upper arm circumference (MUAC) can be used in the presence of severe oedema, or in the absence of weight measurement, to estimate BMI (MUAC of <23 cm often indicates a BMI <20 kg/m2)
- Hand grip strength may be used as a surrogate marker for muscle strength



Medical nutrition therapy



What is the phenotype? What is the aim

- **Stable COPD:** it may be appropriate to aim for an increase in body weight and muscle mass (lean tissue).
- Amongst those who are malnourished a 2 kg increase is suggested as a threshold at which functional



What is the phenotype? What is the aim

- **Acute Exacerbations:** minimizing the loss of weight and muscle mass (lean tissue) through nutritional intervention may be an appropriate goal



What is the phenotype? What is the aim

- **Pulmonary Rehabilitation:** is recommended as part of the management of individuals with COPD, and nutrition should be incorporated as part of the intervention.

• Nutritional intervention in patients with COPD at risk of malnutrition has been found to be associated with improved outcomes of exercise programmes.



What is the phenotype？What is the aim

- If the aim of the nutritional intervention is weight gain, nutritional support alone is effective



Management options

- Dietary advice
- Assistance with eating
- Texture modified diets
- Oral nutritional supplements (ONS)



What is the phenotype? What is the aim

Multi-modal interventions:

If the aim is to treat FFM depletion commonly seen in the sarcopenic and frail COPD phenotypes, then a combination of therapies is likely to be required (high-energy, high-protein, specific nutrients (e.g., leucine, PUFA), resistance training, anabolic pharmacotherapy).



Energy

- Resting energy expenditure: ↑ (moderately-hypermetabolic state)
- Physical activity: ↓ / —
- Nutritional requirements for COPD patients should be assessed individually considering the patient's clinical state (stable or exacerbation) and disease severity (mild, moderate, severe, very severe) as well as their likely activity levels.



Energy requirement

- Energy requirements for individuals with COPD for weight maintenance can be approximately **30 kcal/kg** body weight/day



Energy requirement

- in patients with COPD identified as malnourished, a therapeutic target for nutritional support should be an increase in weight of at least 2 kg which could be facilitated with nutritional targets of at least **45 kcal/kg** body weight/day (potentially higher if the aim is for improvements in FFM).



- Recent recommendations in relation to protein requirements and ageing suggest a daily intake of **1.0–1.2 g protein/kg body** .
- **Protein requirement**
- However, older individuals who are malnourished, or those with a chronic disease, the recommended intake is 1.2–1.5 g protein/kg body weight/day (ESPEN guideline)



Protein requirement

- 0.8 - 1.5 g protein/kg of body weight/day for non-malnourished/not at nutritional risk/stable COPD
- up to 1.5 g protein/kg of body weight/day in acutely unwell (exacerbating) patients
- Where the goal is to gain or retain lean mass, it is possible up to 1.5 g protein/kg of body weight/day in conjunction with exercise (e.g. pulmonary rehabilitation) (NICE)



Vitamins and minerals

- Adequate mineral and vitamins intake:
- Vegetable, fruit, dairy products intake



Vitamins and minerals

High risk of osteoporosis:

- Steroid therapy
- Inactivity
- Little exposure to sunlight
- Attention should be given to addressing requirements for Vitamin D and calcium including the need for supplementation



Medical nutrition interventions

- **Medical nutrition interventions** providing adequate protein, the amino acid leucine, vitamin D and PUFA may convey added benefits in the management of sarcopenia and functional decline



Medical nutrition interventions

- Vitamin E (400 IU daily for 12 weeks) has been found to reduce lipid peroxidation in COPD
- Supplementation with vitamin A resulted in improvements in forced expiratory volume in 1 second
- Vitamin D it has been found to reduce COPD exacerbation rates .



Medical nutrition interventions

- Leucine has been found to have three-times the potency of other essential amino acids in stimulating anabolic signalling in skeletal muscle

- The active leucine metabolite, beta-hydroxy-beta-methyl butyrate (HMB), has been found to prevent FFM loss during bedrest and in a cohort of older hospitalised patients HMB was found to result in better odds of malnutrition treatment



Rout of medical nutrition therapy

Prescribe:

Average 2 ONS per day [58-59] ** in addition to oral intake (or 1 'starter pack', then 60 of the preferred ONS per month)

12 week duration according to clinical condition/nutritional needs[1,32,58]

Patients may benefit from a **high protein, high energy, low volume ONS in addition to dietary advice** due to symptoms of COPD[43]

If following a pulmonary rehabilitation programme consider increased energy and protein requirements

↓

Monitor compliance to ONS after 4 weeks
Amend type/flavour if necessary to maximise nutritional intake

↓

Monitor progress and review goals after 12 weeks
Monitor thereafter every 3 months or sooner if clinical concern
Consider weight change, strength, physical appearance, appetite, ability to perform daily activities etc

↓



Oral Nutrition Support

ONS increase total nutrient intakes (energy, protein and micronutrients) without affecting dietary intake

- Higher energy ONS (≥2 kcal/ml) or low volume, high energy ONS (125 ml) may aid compliance and be easier to manage for individuals with early satiety and/or breathlessness
- Increased requirements for protein and other nutrients in COPD may be managed with a high protein, high energy, low volume ONS



Oral Nutrition Support

- Low volume, energy dense ONS to be taken in small, frequent doses e.g. between meals (frequent small amounts of ONS are preferred to avoid postprandial dyspnoea and satiety as well as to improve compliance
- Clinical benefits of ONS are often seen with 300-900 kcal/day (average 2 bottles), typically within 2-3 months of supplementation



Have nutritional goals been met?

NO

YES

Goals met/good progress:

Encourage oral intake and dietary advice

Consider reducing to 1 ONS per day for 2 weeks before stopping

Maximise dietary intake, consider powdered nutritional supplements/self-purchase

Ensure patient has received dietary advice leaflet to support meeting nutritional needs using food

Monitor progress, consider treating as 'medium risk'

Goals not met/limited progress:

Check ONS compliance; amend prescription as necessary, e.g. suitability of flavours prescribed

If patient is non-compliant reassess clinical condition, refer to a Specialist Dietitian and/or assess the need for more intensive nutrition support e.g. tube feeding

Consider goals of intervention, ONS may be provided as support for individuals with deteriorating conditions

Review every 3-6 months or upon change in clinical condition[32]

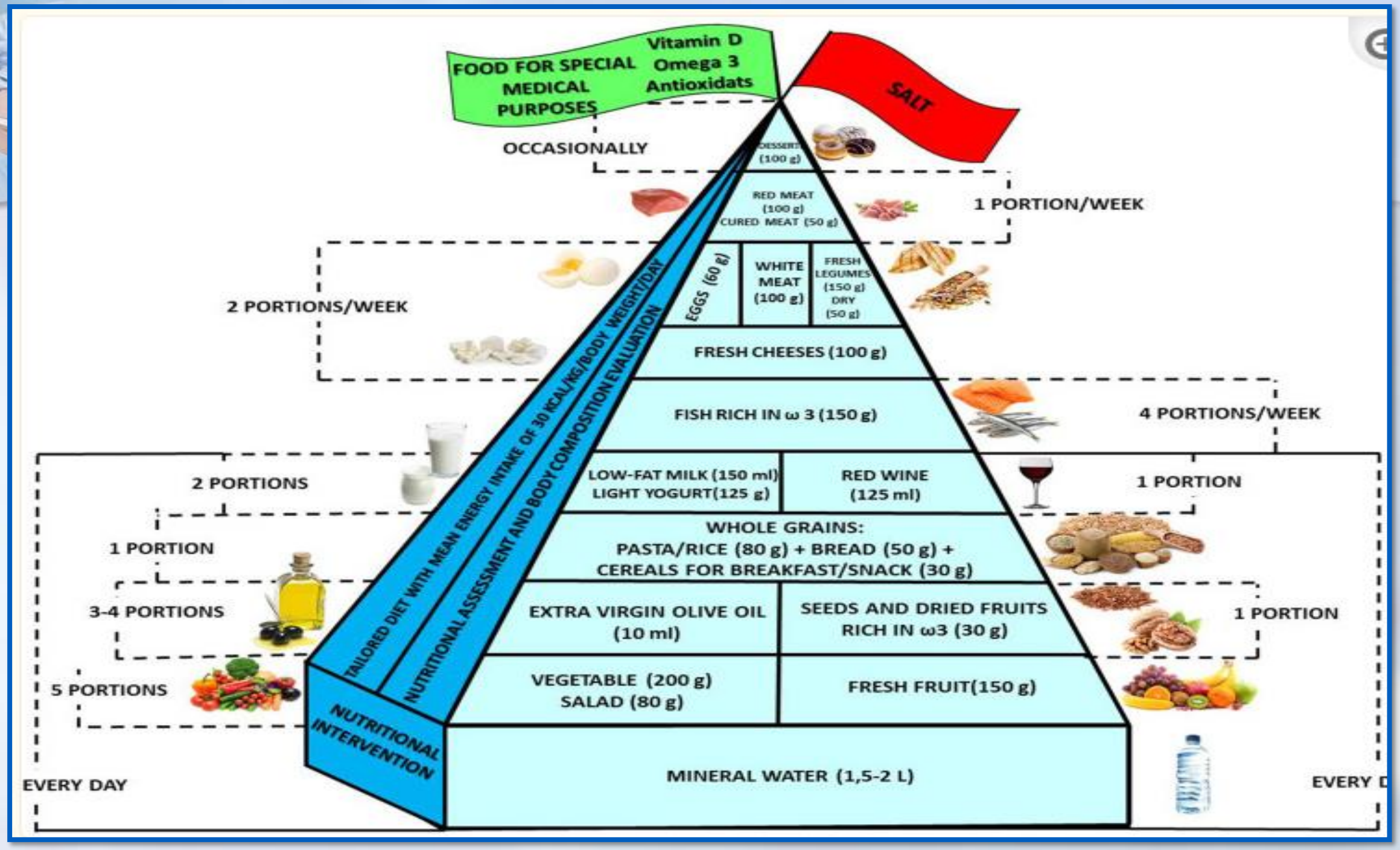
When to stop ONS prescription:

If goals of intervention have been met and individual is no longer at risk of malnutrition reinforce advice given on nourishing diet and the importance of avoiding unintentional weight loss

If individual is clinically stable/acute episode has abated

If individual is back to an eating and drinking pattern which is meeting nutritional needs[32]

If no further clinical input would be appropriate


FOOD FOR SPECIAL MEDICAL PURPOSES
Vitamin D
Omega 3
Antioxidats
SALT
OCCASIONALLY
DESSERT (100 g)
1 PORTION/WEEK
RED MEAT (100 g)
CURED MEAT (50 g)
2 PORTIONS/WEEK
EGGS (60 g)
WHITE MEAT (100 g)
FRESH LEGUMES (150 g) DRY (50 g)
FRESH CHEESES (100 g)
FISH RICH IN ω 3 (150 g)
4 PORTIONS/WEEK
2 PORTIONS
LOW-FAT MILK (150 ml) LIGHT YOGURT(125 g)
RED WINE (125 ml)
1 PORTION
1 PORTION
WHOLE GRAINS:
PASTA/RICE (80 g) + BREAD (50 g) +
CEREALS FOR BREAKFAST/SNACK (30 g)
3-4 PORTIONS
EXTRA VIRGIN OLIVE OIL (10 ml)
SEEDS AND DRIED FRUITS RICH IN ω3 (30 g)
1 PORTION
5 PORTIONS
VEGETABLE (200 g)
SALAD (80 g)
FRESH FRUIT(150 g)
TAILORED DIET WITH MEAN ENERGY INTAKE OF 30 KCAL/KG/BODY WEIGHT/DAY
NUTRITIONAL ASSESSMENT AND BODY COMPOSITION EVALUATION
NUTRITIONAL INTERVENTION
MINERAL WATER (1,5-2 L)
EVERY DAY
EVERY D



References

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