

Research Article

Chronic Obstructive Pulmonary Diseases Nutritional Guideline

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Abstract: Nutrition and metabolism have been the topic of extensive scientific research in chronic obstructive pulmonary disease (COPD). Clinical awareness of the impact dietary habits, nutritional status and nutritional interventions may have impact on COPD incidence, progression and outcome is limited. This Article will provide a clear map of nutritional guidelines chronic obstructive pulmonary diseases.

Keywords: COPD, Nutrition, Malnutrition.

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INTRODUCTION

Nutrition and metabolism have been the topic of extensive scientific research in chronic obstructive pulmonary disease (COPD). Clinical awareness of the impact dietary habits, nutritional status and nutritional interventions may have impact on COPD incidence, progression and outcome is limited. Authors' task is created and delivered a summary of the evidence and description of current practice in nutritional assessment and therapy in COPD, and to provide directions for future guidelines. (Brug, J. *et al.*, 2004) Nutrition has been the topic of extensive scientific practical guidelines in chronic obstructive pulmonary disease (COPD). This guideline will introduce the nutritional assessment, management and interventions that may have impact on the incidence, progression and outcome of COPD. The guideline aims to raise awareness about diet and nutrition in COPD, and to deliver a resource that will assist clinicians and dietitians in providing high-quality nutritional assessment and care to COPD patients. The guideline discussed range from understanding altered metabolism and related therapeutic targets in COPD, to improving dietary habits, outcome and cost-effectiveness of nutritional interventions including recommendations for future translational, epidemiological and clinical research. Guideline selection was based on scientific importance and clinical relevance to ensure the guideline would be

of interest to members of the medical Society. (Collins, P. F. *et al.*, 2012)

Chronic obstructive pulmonary disease (COPD) as defined by The Global Initiative for Chronic Obstructive Lung Disease (GOLD) is characterized by airflow limitation that is usually progressive, partly reversible and associated with an enhanced chronic inflammatory response in the airways and the lungs to noxious stimuli. COPD is presently the fourth leading cause of death and may become the third leading cause by 2030, as estimated by the World Health Organization (WHO). Considering the impact on the society's medico-economic burden by this disease, the preventive and therapeutic measures for the disorder are being relentlessly. The majority of the patients with severe COPD are lean, and frequently in a malnourished or undernourished state, referred to as "pulmonary cachexia syndrome" (PCS), which is characterized by loss of fat-free, body mass causing muscle wasting. (Collins, P. F. *et al.*, 2012; Elfagi, S. 2018) It is to occur in 25% to 40% of COPD patients and is associated with an accelerated decline in functional status, carrying an unfavourable prognosis. Figure (1) shows the blue bloater and pink buffer of COPD. The aim of this paper is to provide step by step nutritional management guideline for COPD patients.



Figure 1: COPD Blue bloater Versus Pink Buffer

METHODOLOGY

Google Scholar search engine was used to gather information relating to nutritional management guideline for COPD patients. The studies were written in English. The period of literature age has extended from the inception of the search engine to the first of April 2020. The search generated about 39 sources, of which 11 sources were used. These 11 articles were considered relevant because they answered the objectives of the review. The library databases such as PubMed and MEDLINE were also used during the study.

COPD Nutrition Interaction

COPD Patients are often noticed to have decreased body weight. 25-40% of all COPD patients have low body weight. 25% of patients having moderate to severe weight loss; while 35% of patients with extremely low fat-free mass (FFM) index. COPD Patients' survival time is about 2 to 4 years in patients with severe disease who are lean. COPD patients with an initial body mass index (BMI) of less than 20 kg/m² or weight loss during the one-year follow-up period have a higher risk of acute exacerbations with a high mortality rate as compared to COPD patients with a BMI of 20 kg/m² or greater or no weight loss. The pulmonary cachexia syndrome; weight loss of 5- 10% of initial body weight, weight <90% (IBW), or weight loss exceeding 5% in the past 3-12 months is a common feature among COPD patients. Factors contribute to a progressive reduction in body mass include tissue hypoxia, disuse atrophy, changes in metabolism and caloric intake, oxidative stress, aging, inflammation, and medications (glucocorticoids) and malnutrition. Accordingly, COPD patients have increased (REE). (National Institute for Health and Care Excellence (NICE). 2015) Furthermore, COPD patients have a reduced dietary intake due to loss of appetite because of decreased general physical activity, a tendency towards depression, or dyspnea while eating. COPD is

recognized as a systemic inflammatory disorder associated with increased production of inflammatory cytokines such as interleukin (IL)-6, IL-8, and tumour necrosis factor (TNF)- α , and chemokines. There is a significant correlation between increased levels of IL-6 and decreased appetite. The association of weight loss and muscle wasting in COPD patients have been shown to increase morbidity and mortality. Nutrition supplement therapy along with exercise is advised in such patients. (National Institute for Health and Clinical Excellence (NICE). 2018)

Nutritional Support for COPD Patients

Reducing the work of breathing by optimizing the lung function is a key step for COPD patients. This reduces the caloric requirement and expenditure and also increases patient's adherence to exercise. Regular exercise; this not only stimulates appetite, but also improves the effectiveness of nutritional therapy. Nutritional supplement therapy has been proved to be effective for maintaining and improving the muscle strength and exercise tolerance. (National Institute for Health and Care Excellence (NICE). 2015; Nouh, F. *et al.*, 2017) A significant improvement in pulmonary function in COPD patients with a high-fat, low carbohydrate diet as compared with the traditional high carbohydrate diet is noticed in many trails and patients. Resting before meals, and taking daily dose of multivitamins are recommended for COPD patients. Control sodium is another support step. Too much salt causes the body to retain too much water, causing breathing to be more difficult among COPD patients. Avoid overeating and foods that cause gas or bloating. A full or bloated abdomen might make breathing uncomfortable. Clear airways at least one hour before eating is important supporting step. Eat slowly, and choose foods that are easy to chew helps COPD patients. Figure (2) shows some supportive steps for COPD patients. (Parenteral and Enteral Nutrition Group (PENG).2019; Park, S. K. *et al.*, 2013)

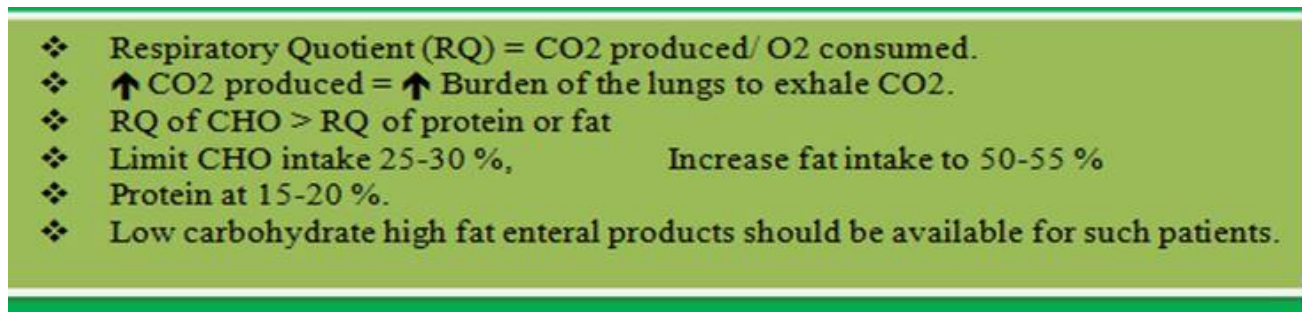


Figure 2: Nutritional supportive steps for COPD patients

Factors of malnutrition in COPD patients

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. (Park, S. K. *et al.*, 2013) Medication factors: e.g. 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). Consequences of malnutrition in COPD include reduced muscle strength, reduced respiratory muscle function, longer hospital stays, increased healthcare costs, increased mortality. Figure (3) shows consequences of malnutrition among COPD patients.(Nouh, F. *et al.*, 2017; Parenteral and Enteral Nutrition Group (PENG). 2019; Park, S. K. *et al.*, 2013).

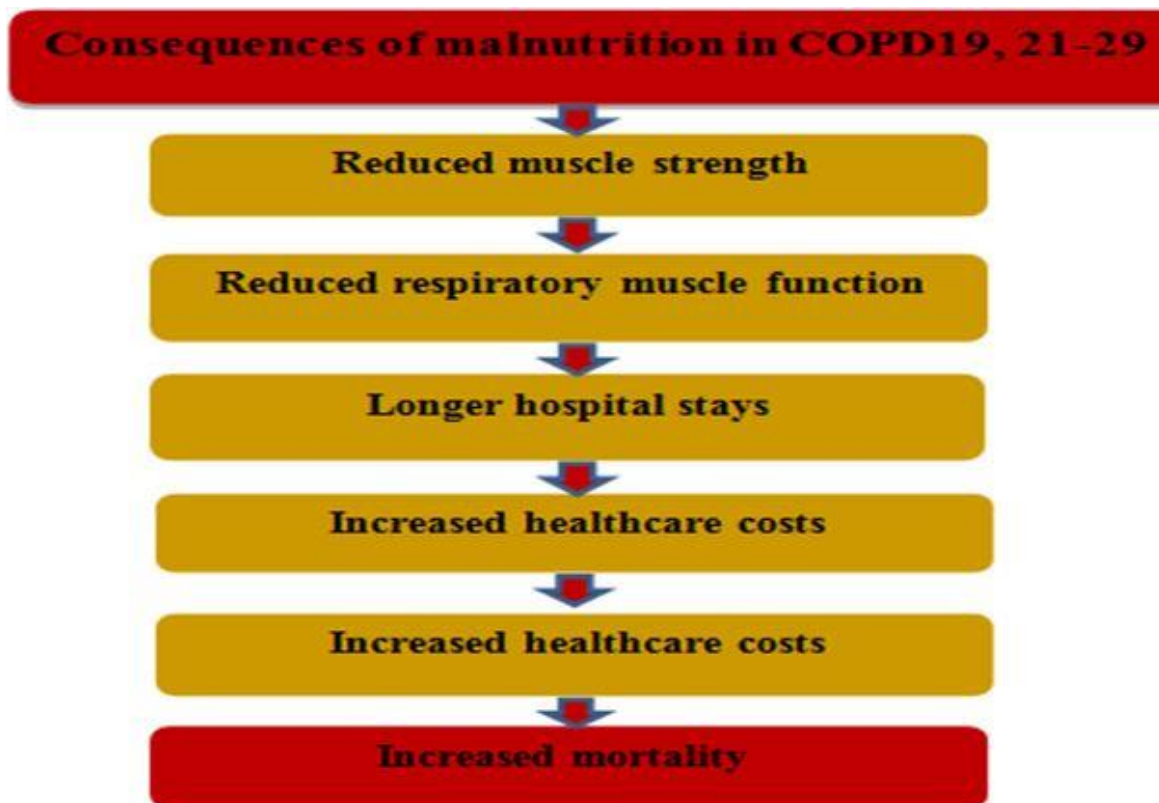


Figure 3: Consequences of malnutrition among COPD patients

Principles of the Management of Malnutrition in COPD

Once the patient identified as at risk of malnutrition, individuals with COPD can be managed by using the

principles of the management strategies in the pathway as mentioned below: Management of malnutrition should be linked to the risk category and record of risk as shown in figure (4).

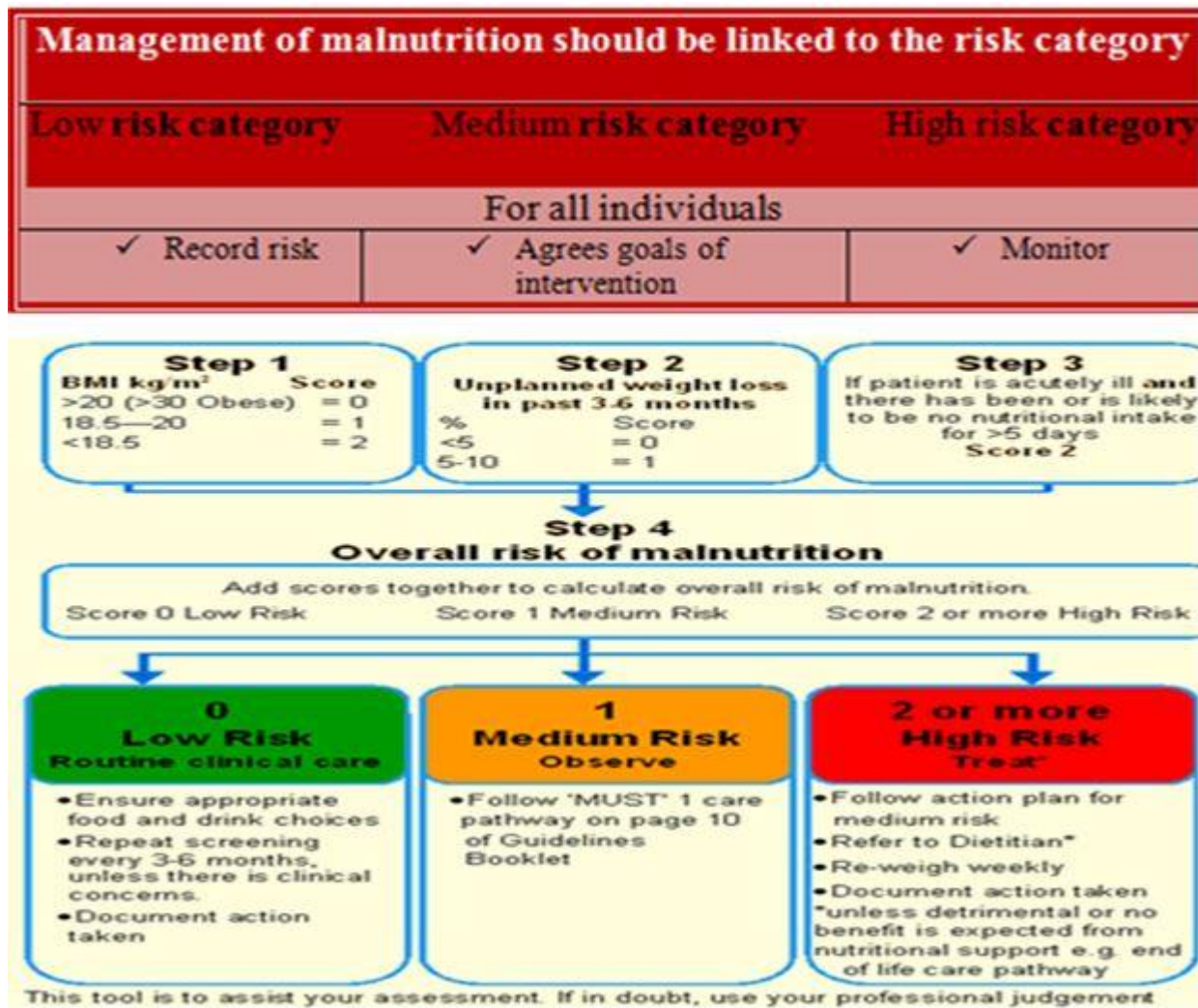


Figure 4: Management of malnutrition according to risk category and risk record

Identification of Malnutrition “Nutritional Screening”

Identifying and managing malnutrition can improve nutritional status, clinical outcomes and reduce healthcare use. NICE guidelines recommend BMI is calculated in all patients with COPD and that attention should be paid to unintentional weight loss particularly in older people. Screening should take place on first contact with a patient and/or upon clinical concern e.g. recent exacerbation, change in social or psychological status. (Powell-Tuck, J., 2003) NICE recommends attention is paid to changes in weight in older people, particularly if the change is more than 3 kg – such weight changes should however be taken within the context of the individuals original weight as a 3 kg weight loss in a 100 kg individual and a 45 kg individual is very different. The Malnutrition Universal Screening Tool (‘MUST’) is a simple 5 step screening tool that can be used across care settings to identify adults who are at risk of malnutrition. Unintentional weight loss of 5 – 10% over 3 – 6 months indicates at risk of malnutrition. MUST’ is a predictor for risk of death and readmission in patients with COPD. (van de Bool, C. *et al.*, 2017)

Goals of Nutritional Intervention

Setting goals to assess the effectiveness of intervention, taking into account the stage of the disease e.g. nutritional support for weight maintenance or weight gain is important step for effective nutritional management for COPD patients. Goals could include: increase lean body mass, improve nutritional status, improve respiratory function, stabilize weight and retain function. Goals need to be adjusted according to phase of disease. Among stable COPD patients, it is recommended that increase in body weight and muscle mass (lean tissue). (Collins, P. F. *et al.*, 2012; Elfagi, S. 2018) Amongst those who are malnourished a 2 kg increase is suggested to achieve weight gain will depend on the individual's condition. During acute exacerbations; it is recommended that minimizing the loss of weight and muscle mass (lean tissue) through nutritional intervention may be an appropriate goal. During pulmonary rehabilitation;(van de Bool, C. *et al.*, 2017) it is recommended that Dietary advice within programs should be tailored to the individual e.g. for obese patients the goal may be weight reduction with preservation of muscle mass (lean tissue). Consideration

should be given to optimizing nutritional status during pulmonary rehabilitation. Muscle protein is directly affected by protein intake in the diet and muscle oxidative metabolism may be stimulated nutritionally. Nutritional status should be monitored before, during and after pulmonary rehabilitation

Management of Malnutrition

Management options can include: dietary advice, assistance with eating, texture modified diets and oral nutritional supplements (ONS) where indicated. Dietary advice should aim to increase intake of all nutrients including energy, protein and micronutrients (vitamins and minerals). Dietary advice and ONS should be considered for those at risk of malnutrition to ensure further weight loss is prevented and functional measures are improved (e.g. sit to stand and 6-minute walk test). (Brug, J. *et al.*, 2004) Consideration should be given to issues which may impact on food intake and the practicalities of dietary advice, such as access to food, reduced mobility and breathlessness. Smoking cessation is an important strategy to support the management of malnutrition and may increase appetite and support weight gain. Patients may also find their senses of smell and taste are enhanced if smoking is stopped; making food more

pleasurable. Encourage smoking cessation to preserve lung function and improve appetite and taste.

Management of COPD malnutrition

First Line Management Pathway: According to Risk Category Using MUST as shown in figure 5. Low risk which equals to Score 0 means Routine clinical care by Providing 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 which equals to Score 1 Observe requires dietary advice to maximize 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 recommends6 COPD patients with a BMI. High risk which equals to Score 2 or more means needs treatment with dietary advice to maximize nutritional intake. Encourage small frequent meals and snacks, with high energy and protein food and fluids, prescribe oral nutritional supplements (ONS), and refer to dietitian if no improvement or more specialist support is required. (Parenteral and Enteral Nutrition Group (PENG).2019; van de Bool, C. *et al.*, 2017).

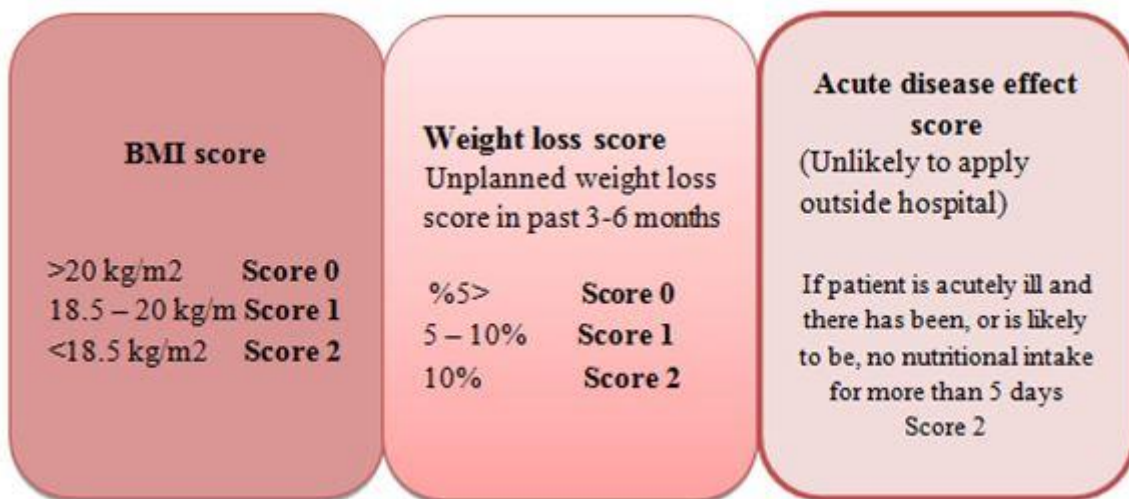


Figure 5: Risk Category Using MUST

The following indicators can be used collectively to estimate risk of malnutrition in the absence of height and weight (measured or recalled); thin or very thin in appearance, or loose fitting clothes/jewellery, hhistory of recent unplanned weight loss, changes in appetite need for assistance with feeding or swallowing difficulties affecting ability to eat and drink, and a reduction in current dietary intake

compared to normal level. Figure (6) shows estimated risk of malnutrition among COPD patients. However, for all individuals • Discuss when to seek help e.g. ongoing weight loss, changes to body shape, strength or appetite. • Refer to other health care professionals if additional support is required (e.g. dietitian, physiotherapist, GP). (Park, S. K. *et al.*, 2013; van de Bool, C. *et al.*, 2017)

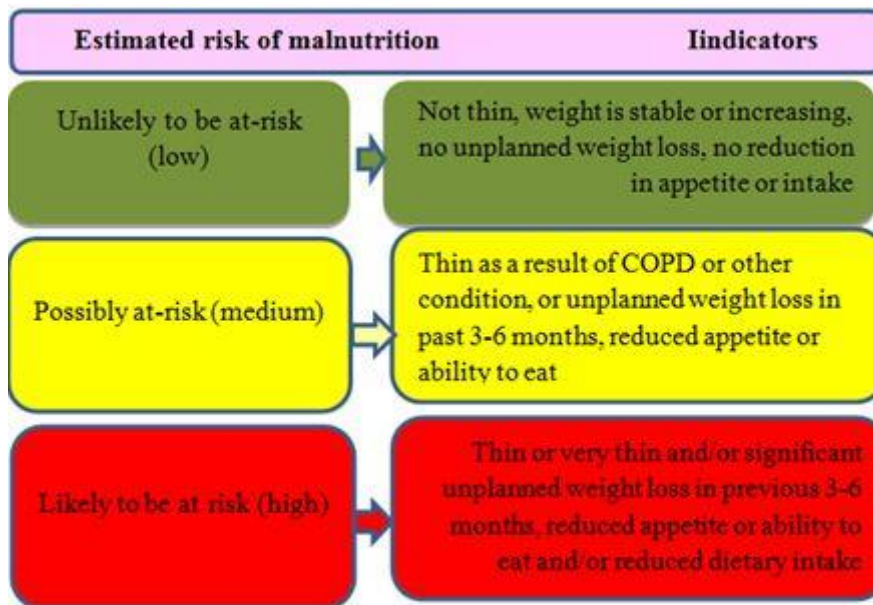


Figure 6: Estimated risk of malnutrition

Nutritional Recommendations

It is recommended to use modified food texture (soft diet) for those with chewing and swallowing problem related to shortness of breath. Unless contraindicated, a high fluid intake will help thin mucous excretion: Usually 1ml/Kcal is sufficient. It is recommended to Limit liquids with meals; drink an hour after meals.(Wouters, E. F. 2000) Patients with hypercapnia or those on ventilators; It is recommended to modify macronutrient composition. It is recommended to use 4 -6 small dense in nutrient content meals /day. This enables diaphragm to move freely and lets lungs fill with air and empty out more easily. It is recommended to eat fruits, vegetables, legumes, and whole-grain cereals as they contain antioxidants, minerals, vitamins, flavonoids, phytochemicals, and fiber. It is recommended to use omega-3 and (PUFA) have an anti-inflammatory effect and may be of benefit in COPD and also in

malnourished patients. The serum levels of vitamin D have been found to be low in COPD patients. This may be due to the immune-modulatory effect of vitamin D, and it also helps to decrease the myopathy/muscle weakness. Vitamin C and E supplementation also plays a promising role in alleviating COPD symptoms. It is recommended to limit simple carbohydrates, including table sugar, candy, cake and regular soft drinks. It is recommended to choose mono- and poly-unsaturated fats: do not contain cholesterol. These are fats that are often liquid at room temperature and come from plant sources, such as canola, safflower and corn oils. It is recommended to eat more food early in the morning if patient is usually too tired to eat later in the day. It is recommended to avoid foods that cause gas or bloating. They tend to make breathing more difficult. Figure (7) shows eat well diagram for COPD patients.(van de Bool, C. *et al.*, 2017; Wouters, E. F. 2000)

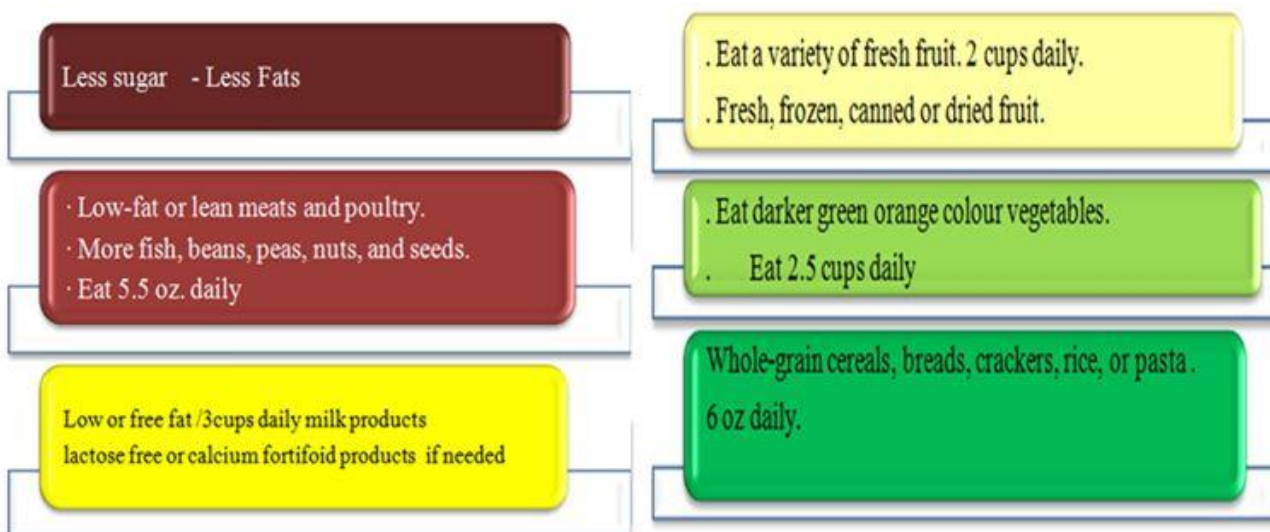


Figure 7: Eat Well diagram for COPD patients

Competing interests

Authors have declared that no competing interests exist.

CONCLUSION

Nutritional management of COPD patients is crucial step among the overall medical management. More data need to be analysed on the impact of nutritional status and dietary modification on COPD patients. This paper tried to provide a completed picture of COPD nutrition interaction throughout nutrition screening, assessment, and intervention.

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