

Nutrition and COPD

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INTRODUCTION

- Changes in diet like decreased consumption of fruits, vegetables, whole grains and fish, and increased consumption of processed and refined foods, have increased the prevalence of chronic diseases, including chronic obstructive pulmonary disease (COPD), in the past few decades.¹
- Advanced COPD patients demonstrate an abnormal nutritional status with unintended weight loss, muscle loss, low-fat and fat-free mass associated with the presence of emphysema, which serves as an independent determinant of COPD outcomes and thus demands nutritional interventions.¹
- Scientific evidence suggests that some foods and nutrients, particularly those nutraceuticals enriched with antioxidant and anti-inflammatory properties, when consumed in combinations in the form of balanced dietary patterns, render better pulmonary function, less lung function decline and reduced risk of COPD.¹

WHY DIETARY MANAGEMENT AND NUTRITIONAL SUPPLEMENTATION IS IMPORTANT IN COPD?

It Treats Weight Loss in COPD

- A patient with a negative energy balance or losing weight rapidly will require increased energy intake since an additional reduction of energy expenditure is not desirable in COPD.²
- Several small portions of diet spread throughout the whole day will give optimum energy- and protein-enriched diet.²
- Current guidelines recommend protein must provide 20% of the total energy intake.²
- Low energy intakes make it hard to fulfill the vitamins, minerals and trace elements requirements. Thus, oral nutritional supplements can prove beneficial

to fulfill nutrient requirements when supplemented along with food.²

- There is moderate-quality evidence that suggests nutritional supplementation promotes weight gain among patients with COPD, particularly undernourished.²
- Undernourished patients have shown significant weight gain, improvement in anthropometric measures (fat-free mass, mid-arm muscle circumference and triceps skin folds), 6-min walk distance, respiratory muscle strength (maximal inspiratory and expiratory pressures) and overall health-related quality of life as measured by the St George's Respiratory Questionnaire after nutritional supplementation.²

Nutrition Acts as an Ergonic Aid in COPD

- Enhancing physical performance is a key therapeutic goal in COPD, which can be achieved by nutritional intervention.²
- Nutritional therapy in this population can improve performance as well as enhance the outcome of exercise training that provides clinical and physiological benefit in COPD.²
- Carbohydrate-rich supplements and polyunsaturated fatty acids (PUFAs) have been shown to improve outcomes or exercise training in selected COPD patients.²

It is Cost-effective

Undernourishment in COPD is likely to be associated with:

- Longer in-patient hospital stays²
- A higher probability of being readmitted²
- An increase in health care utilization.²

THERE IS PRESENCE OF INAPPROPRIATE DIETARY QUALITY AND NUTRIENT DEFICIENCIES IN COPD

COPD is frequently associated with vitamin D deficiency and insufficient intake of vitamin with antioxidant capacity (vitamins A, C and E).²

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Vitamin D

- Vitamin D status serves as an independent predictor of all-cause mortality, upper airway respiratory infections and pulmonary function in the general population.²
- But for COPD, the evidence is conflicting on whether 25-hydroxyvitamin D (25[OH]D) levels correlate with lung function decline, infectious exacerbations and muscular function.²
- Vitamin D deficiency is common in COPD because of smoke-induced skin aging, reduced outdoor activity and low-quality dietary intake.²
- Daily intakes along with a minimal amount of ultraviolet radiation exposure vary with age but a dose of 800 IU with 1 g calcium is considered optimum.²

Vitamin E

Long-term supplementation with vitamin E has shown to reduce the risk of COPD but no evidence exists on the positive effects of additional vitamin intake on clinical outcomes in a COPD population.²

Prudent Diet

A prudent diet in COPD is linked with better pulmonary function, less lung function decline and reduced risk of COPD.²

Iron

Iron deficiency also frequently occurs in COPD due to several factors including systemic inflammation, malabsorption of iron from the gut, renal failure (as a consequence of concomitant chronic kidney disease or diabetes mellitus), and medications such as angiotensin-converting enzyme inhibitors and corticosteroids.²

Dietary Fiber

Greater intake of dietary fiber is linked with a reduced COPD risk, better lung function and reduced respiratory symptoms.²

Meat

Frequent or high consumption of cured meats is associated with an increased risk of developing COPD and a higher risk of readmission to hospitals with COPD.² Thus, a well-balanced diet with a sufficient intake of fresh fruits and vegetables is advantageous for COPD patients due to their potential benefits on the lung and their proven benefits on metabolic and cardiovascular risk.²

NUTRITION IS A PART OF INTEGRATED DISEASE MANAGEMENT

The efficacy of nutritional supplementation can be intensified by additional interventions like:

- Smoking cessation²
- Correction of hypoxemia and/or hypercapnia with long-term oxygen therapy and/or noninvasive ventilation²
- Reduction of static and dynamic hyperinflation by long-acting bronchodilators or lung volume reduction, or androgens either to correct hypogonadism or to boost muscle anabolism.²

Multimodal rehabilitation program including nutritional supplementation, androgens and exercise training improves clinical outcome and survival in malnourished patients with advanced COPD.²

EFFECT OF DIETARY PATTERN IN COPD OUTCOME

Numerous epidemiological studies linking dietary patterns to adult lung function and COPD (incidence, prevalence and severity) have shown:¹

Meat-Dim-Sum Pattern and Vegetable-Fruit-Soy Pattern

The meat-dim-sum pattern is associated with increased incidence of cough with phlegm.¹

Prudent Pattern and Western Pattern

The prudent pattern is negatively, while the Western pattern is positively associated with COPD risk.¹

Prudent Pattern and Traditional Pattern

The prudent pattern is positively associated with forced expiratory volume in 1 second (FEV1) in males and females, and negatively with COPD in males.¹

Prudent Pattern, High-carbohydrate Diet, Western Pattern

The prudent pattern is positively associated with lung function and negatively with COPD prevalence.¹

Western Pattern and Prudent Pattern

The Western pattern is associated with a higher prevalence of COPD, respiratory symptoms and worse lung function.

The prudent pattern is associated with a lower prevalence of COPD, cough and higher lung function.¹

Alcohol-consumption Pattern, Westernized Pattern and Mediterranean-like Pattern

Alcohol-consumption pattern and Westernized pattern (in female) are associated with impaired lung function; a nonsignificant trend for preserved lung function is found for Mediterranean-like pattern.¹

Cosmopolitan Pattern, Traditional Pattern and Refined Food Dietary Pattern

The traditional pattern is associated with lower FEV1 and increased prevalence of COPD; the cosmopolitan

pattern is associated with increased prevalence of asthma and wheeze.¹ The refined food pattern is associated with a nonsignificant greater decline in lung function.¹

REFERENCES

1. Scoditti E, Massaro M, Garbarino S, Toraldo DM. Role of diet in chronic obstructive pulmonary disease prevention and treatment. *Nutrients*. 2019;11(6):1357.
2. Schols AM, Ferreira IM, Franssen FM, Gosker HR, Janssens W, Muscaritoli M, et al. Nutritional assessment and therapy in COPD: a European Respiratory Society statement. *Eur Respir J*. 2014;44(6):1504-20.

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History of Infertility and Severity of Menopausal Symptoms

Middle-aged women with a history of infertility have higher odds of experiencing more severe menopausal symptoms compared to those who do not have infertility, according to the results of a recent study published in the journal *Menopause*.¹ They had higher incidence of depressive mood, irritability and difficulties in sleeping.

A secondary analysis of data from Project Viva was conducted by Fitz et al in order to investigate if history of infertility in women had any impact on menopausal symptoms. Project Viva included 695 women aged ≥ 45 years with amenorrhea for ≥ 1 year. They had been enrolled during pregnancy from 1999 to 2002 and followed for 18 years. If time taken to become pregnant was 12 months or more or the participants had used medical treatments to conceive or had infertility consultation or had taken infertility treatment in the preceding 6 months was considered as infertility by the researchers. The severity of menopausal symptoms was evaluated with the Menopause Rating Scale (MRS). A score above or below the median was defined as the primary outcome of the study. The individual symptom score on the MRS and self-reported age at which menopause was attained were the secondary outcomes of the study.

Nearly 37% of women included in the study had a history of infertility. Women with a history of infertility were older in age than those with no infertility; 53.4 vs. 51.2 years. Little over 60% of them had attained menopause compared to 40% without infertility. Women with infertility had higher chances of having scores above the median on the MRS scale with adjusted odds ratio (aOR) of 1.45. They were 1.5 times more likely to report depressive mood and irritability with aOR of 1.56 and 1.57, respectively. The probability of sleep problem severity was nearly doubled in women with infertility with aOR of 1.91. However, infertility and other symptoms or age of menopause had no correlation.

These findings suggest a history of infertility as a red flag to screen menopausal women for symptoms of depression.

Reference

1. Fitz VW, et al. Exploring the relationship between history of infertility and the experience of menopausal symptoms. *Menopause*. 2023;30(9):913-9.