



## Supplementation and Nutrient Imbalances in Chronic Pulmonary Fibrosis

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### DESCRIPTION

Chronic respiratory conditions, such as Chronic Obstructive Pulmonary Disease (COPD), are progressive and irreversible disorders that affect the airways and lungs, causing shortness of breath, cough, and impaired gas exchange. COPD is the third most common cause of death in the United States of America and the fifth most common cause of death worldwide. The main risk factor for COPD is smoking, but other factors such as genetics, occupation, and air pollution may also contribute. Nutrition and metabolism play an important role in the development, progression, and outcome of chronic respiratory conditions. Poor nutritional status, especially low body weight and muscle mass, is a common feature of COPD and is associated with increased morbidity and mortality. Malnutrition in COPD may result from several factors, such as increased energy expenditure due to increased work of breathing, reduced food intake due to dyspnea or depression, altered absorption or metabolism of nutrients due to inflammation or medication use, and increased nutrient losses due to infections or comorbidities.

A comprehensive nutritional assessment should include the measurement of body weight, height, Body Mass Index (BMI), Fat-Free Mass Index (FFMI), Mid-Upper Arm Circumference (MUAC), Triceps Skinfold Thickness (TSF), Handgrip Strength (HGS), and serum albumin. These parameters can help identify patients who are at risk of malnutrition or sarcopenia (loss of muscle mass and function) and monitor their nutritional status over time. In addition, dietary intake should be assessed using food diaries, food frequency questionnaires, or 24-hour recalls evaluating the adequacy of energy and nutrient intake. The main goals of nutritional intervention are to prevent or correct malnutrition, preserve or increase muscle mass and function, improve respiratory function and quality of life, and reduce the risk of exacerbations and hospitalizations. Nutritional intervention should be individualized according to the patient's nutritional status, dietary habits, preferences, symptoms, and comorbidities.

Patients with chronic respiratory conditions should consume enough energy to meet their increased energy requirements and

maintain a stable body weight. The recommended energy intake for patients with COPD ranges from 25 kcal/kg/day to 45 kcal/kg/day depending on their nutritional status and activity level. Patients who are underweight or have low FFMI should aim for a positive energy balance to gain weight and muscle mass. Individuals who are overweight or obese should strive for a calorie deficit to reduce both weight and fat mass while retaining their muscle mass. Patients with chronic respiratory conditions should consume adequate protein to maintain or increase their muscle mass and function. The recommended protein intake for patients with COPD ranges from 1.2 g/kg/day to 1.7 g/kg/day depending on their nutritional status and severity of disease. Patients who are underweight or have low FFMI should consume higher amounts of protein to stimulate muscle protein synthesis. Patients who are overweight or obese should consume moderate amounts of protein to prevent muscle protein breakdown while losing fat mass. Patients with chronic respiratory conditions should consume moderate amounts of carbohydrates to provide energy and spare protein for muscle synthesis. However, excessive carbohydrate intake may increase carbon dioxide production and worsen dyspnea. Therefore, patients with COPD should limit their carbohydrate intake to less than 55% of total energy intake. Patients who have diabetes or impaired glucose tolerance should also monitor their blood glucose levels and choose low glycemic index carbohydrates.

However, excessive fat intake may increase oxygen consumption and worsen dyspnea. Therefore, patients with COPD should limit their fat intake to less than 30% of total energy intake. Patients who have hyperlipidemia or cardiovascular disease should also limit their saturated fat intake and choose unsaturated fats, especially omega-3 fatty acids. Patients with chronic respiratory conditions should consume adequate amounts of vitamins and minerals to support their immune system and antioxidant defense. However, some micronutrients may have adverse effects on respiratory function if consumed in excess. Therefore, patients with COPD should avoid taking high doses of vitamin A (>1500 mcg/day), vitamin E (>400 IU/day), beta-carotene (>15 mg/day), iron (>18 mg/day), or zinc (>40 mg/day) without medical supervision. Patients who have anemia or

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**Received:** 25-Jul-2023, Manuscript No. JNDT-23-23036; **Editor assigned:** 28-Jul-2023, PreQC No. JNDT-23-23036 (PQ); **Reviewed:** 11-Aug-2023, QC No. JNDT-23-23036; **Revised:** 18-Aug-2023, Manuscript No. JNDT-23-23036 (R); **Published:** 25-Aug-2023, DOI: 10.35248/2161-0509.23.13.254.

**Citation:** Koletzko A (2023) Supplementation and Nutrient Imbalances in Chronic Pulmonary Fibrosis. J Nutr Disord Ther. 13:254.

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osteoporosis should consult their doctor about the appropriate supplementation of iron, calcium, or vitamin D.

Patients with chronic respiratory conditions should consume adequate amounts of fluids to prevent dehydration and mucus accumulation. However, excessive fluid intake may increase blood volume and worsen dyspnea. Therefore, patients with COPD should limit their fluid intake to 1.5 liters to 2 liters per day. Patients who have heart failure or renal failure should also monitor their fluid intake and output and follow their doctor's advice. Patients with chronic respiratory conditions should adopt healthy dietary habits to improve their nutritional status and respiratory function. Nutritional intervention in chronic respiratory conditions may be more effective when combined with other interventions, such as exercise training, pulmonary rehabilitation, smoking cessation, medication adherence, and oxygen therapy.

## CONCLUSION

Nutrition and metabolism are important factors in the management of chronic respiratory conditions. Nutritional assessment and intervention can help prevent or correct malnutrition, preserve or increase muscle mass and function, improve respiratory function and quality of life, and reduce the risk of complications. A well-balanced diet that meets the energy and nutrient requirements of patients with chronic respiratory conditions is beneficial for their health and well-being. Nutritional intervention may also improve the cost-effectiveness of the management of chronic respiratory conditions by reducing the frequency and severity of exacerbations and hospitalizations.