

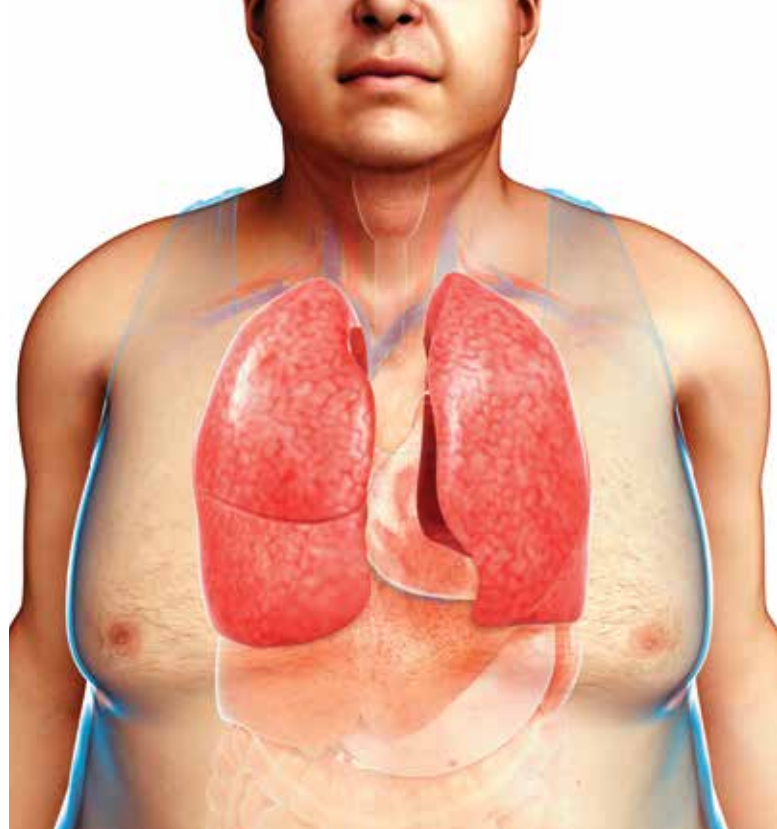
Complexities in managing obesity in COPD

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The coexistence of overweight or obesity and COPD presents both diagnostic and management challenges; however, strategies are available for some patients with these comorbidities to safely lose weight, maintain lean muscle mass and improve exercise tolerance.

The observation that mortality is lower in obese patients with severe chronic obstructive pulmonary disease (COPD) than in their normal-bodyweight counterparts was first described in a study by Wilson and colleagues in 1989, and gave rise to the theoretical 'obesity paradox'.¹ A larger study by Landbo and colleagues in 1999 demonstrated this association more clearly.² They showed a relative risk of mortality of 0.3 for patients with severe COPD if they were obese compared with those of normal bodyweight.² Several other studies have supported this association.^{3,4}

There is, however, considerable doubt about the significance of the above findings and many authors have postulated confounding factors that cause the association.⁵ These include obesity causing a restrictive defect that leads to an overestimation of severity in this group, and body mass index (BMI) being less predictive of survival than percentage of fat-free mass.⁶ Interestingly, the paradox is less



Key points

- The 'obesity paradox' in which mortality appears to be lower in obese patients with COPD than in their normal-weight counterparts is overemphasised in importance.
- The combination of obesity and COPD is associated with decreased exercise tolerance and increased dyspnoea and cardiovascular risk in affected patients.
- Obesity and COPD are two heterogeneous chronic conditions with increasing prevalence.
- There are safe ways for obese patients with COPD to lose weight, maintain lean muscle mass and improve fitness.
- Strategies to encourage healthy lifestyle changes and education on the importance of adequate protein intake can be implemented by GPs in some overweight and obese patients with COPD.

pronounced in fitter obese patients, and certain patterns of obesity, such as abdominal obesity as measured by increased waist circumference, are associated with lower survival because of myocardial infarction.^{7,8} It is possible that losing weight has far more impact on mortality, and thus obesity may be less protective than first hypothesised.⁹

Prevalence of coexisting COPD and overweight or obesity

Although many patients with COPD have malnutrition, a significant proportion are actually overweight or obese.¹⁰ A study by Liu and colleagues in 2015 showed that patients who were obese (8.5%) or morbidly obese (15.4%) were more likely to have COPD than patients with normal body weight (6.7%).¹¹

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Table 1. Malnutrition screening tool²²

Question	Score
<i>Have you lost weight recently without trying?</i>	
No	0
Unsure	2
Yes 1 to 5 kg	1
6 to 10 kg	2
11 to 15 kg	3
>15 kg	4
<i>Have you been eating poorly because of a decreased appetite?</i>	
No	0
Yes	1
Total score*	

* A Malnutrition Screening Tool score of 2 or more indicates the patient may be at risk of malnutrition. Adapted from Ferguson M, Capra S, Bauer J, Banks M. Development of a valid and reliable malnutrition screening tool for adult acute hospital patients. *Nutrition* 1999; 15: 458-464.²²

The prevalence of obesity in Australia has increased substantially in recent times from one in 20 adults in 1995 to one in 10 adults in 2011 to 2012.¹² A large international study in 2016 in more than 18,000 people found the prevalence of COPD and overweight or obesity ranged from 3 to 47%.¹³

The prevalence of COPD is increasing worldwide and there is a need for regularly updated estimates. From 1996 to 2005 its prevalence increased from 7% to 14%.¹⁴ However, data greatly underestimate the total burden of COPD because the disease is usually not diagnosed until it is clinically apparent and moderately advanced and the definition of COPD varies between studies.¹⁵ Despite this, it is widely accepted that this prevalence is continuing to increase.¹⁴

Hence, the combined problem of COPD and overweight or obesity will increase and it is important that strategies are employed to prevent and manage this issue.

Significance of coexisting overweight or obesity and COPD

Underdiagnosis of COPD in overweight and obese patients may be a significant problem because of the superimposed restrictive effect masking airflow obstruction on spirometry

testing. Clinicians need to consider the diagnosis of COPD in overweight and obese patients who are dyspnoeic without obstructive spirometry. Also, there may be considerable overlap of symptoms of dyspnoea in patients with both conditions. Overweight and obesity may therefore compound the detection of COPD in numerous ways, so an index of suspicion should be maintained. In addition, other comorbidities that are associated with obesity such as obstructive sleep apnoea and obesity hypoventilation syndrome should be considered.

Harmful effects of obesity on COPD

Obese patients are more breathless than nonobese patients for various reasons. An increased work of breathing is present, related to an increased respiratory muscle workload due to decreased lung compliance, especially in patients with abdominal obesity. van de Boel and colleagues describe abdominal obesity and an elevated abdominal visceral fat mass, independent of BMI, contributing to increased cardiovascular risk and determining COPD outcome.¹⁶ There is also impaired gas exchange secondary to microatelectasis. More recent studies report that obese patients are more susceptible to



Figure 1. Assessment of abdominal obesity by waist circumference measurement is recommended for all patients with COPD.

the effects of inhaled particles and second-hand smoke exposure.^{17,18}

Metabolic syndrome, COPD and overweight or obesity

The overall prevalence of metabolic syndrome in patients with COPD was 34% in a 2016 study by Cebon Lipovec and colleagues.¹⁹ Patients with COPD and the metabolic syndrome have been found to have a low-grade inflammatory state that may play a role in the observed increased prevalence of cardiovascular events in these patients. Metabolic syndrome is seen more often in overweight and obese patients with COPD who have increased epicardial fat tissue.¹⁹ These findings have led some authors to postulate the existence of a new COPD phenotype in which patients are overweight or obese and have emphysema and systemic inflammation, distinct from the traditional ‘blue bloater’.²⁰

Assessment

Regular nutritional and anthropometric screening should be conducted in all patients with COPD, even in those who appear generally well.²¹ Due to the increased associated risk of cardiovascular disease, obese patients should undergo, and overweight patients be considered for, cardiovascular disease risk assessment with referral to a cardiologist as appropriate.¹⁹

Monitoring and documenting weight and BMI as well as conducting routine nutritional screening, using a validated tool such as the

Assessing and managing overweight and obesity in patients with COPD

Patient presents who is overweight or obese and has COPD

Measure patient's body mass index (BMI) and waist circumference to classify weight and assess risk of chronic diseases:

BMI

- Overweight: 25 to 29.9kg/m²
- Obese class 1: 30 to 34.99kg/m²
- Obese class 2: 35 to 39.99kg/m²
- Obese class 3: >40kg/m²

Waist circumference

- Increased risk: male >94cm; female >80cm
- Greatly increased risk: male >102cm; female >88cm

Assess patient's nutritional status using the Malnutrition Screening Tool (MST; Table 1)

MST score ≤1

MST score ≥2

Patient has severe COPD and/or is >65 years

Patient has mild-moderate COPD and/or is <65 years

Patient is at malnutrition risk

- Provide nutritional support, with the goal of weight maintenance, focusing on increased (1.2 to 1.5g/kg daily) protein intake
- Consider referral to dietitian if individualised advice is needed

- Encourage healthy lifestyle changes, with the following goals:
 - for those in obese class 1 to 3 only, weight loss with focus on adequate protein intake and low-calorie diet
 - waist circumference reduction (<94cm male, <80cm female)
 - aim for adherence to the *Australian Guide to Healthy Eating* (Figure 2)²³
- Consider the following:
 - screening for vitamins A, D and E and calcium levels, and if deficient, consider supplementation and/or dietitian referral
 - referral to community weight loss/pulmonary rehabilitation programs (Table 2)
 - referral to dietitian if individualised advice is needed

Refer to dietitian for individualised nutrition support and to physiotherapist for pulmonary rehabilitation

Review MST score at next appointment

Abbreviation: COPD = chronic obstructive pulmonary disease.

Table 2. Examples of community services for overweight and obese patients with COPD

Service	What is available?	Contact details
Get Healthy Coaching Service	<ul style="list-style-type: none"> • 10 free, confidential coaching phone calls with a personal health coach for up to six months • Participants receive free resources with tools to keep track of their goals and progress 	1300 806 258 www.healthdirect.gov.au/partners/get-healthy-information-and-coaching-service
Pulmonary rehabilitation programs	<ul style="list-style-type: none"> • Information on pulmonary rehabilitation programs local to your area 	www.lungfoundation.com.au
Chronic disease management – individual allied health services under Medicare	<ul style="list-style-type: none"> • Medicare rebates for individual allied health services for patients with a chronic (or terminal) medical condition • Medicare rebate for a maximum of five allied health services per patient each calendar year • Patient must have a GP Management Plan (GPMP) and Team Care Arrangements (TCAs) 	www.health.gov.au www.health.gov.au/internet/main/publishing.nsf/Content/Chronic+Disease+Allied+Health+Individual+Services
Private dietitians	<ul style="list-style-type: none"> • Information on accredited practising dietitians local to your area 	www.daa.asn.au/find-an-apd

Malnutrition Screening Tool (MST; Table 1),²² is recommended at each appointment. The MST considers unintentional weight loss and decreased oral intake and guides clinicians in identifying individuals at nutritional risk and establishing appropriate management plans.²² Assessment of abdominal obesity through measurement of waist circumference is also recommended for every patient due to its role in determining COPD outcome independent of BMI (Figure 1 and Flowchart).¹⁶

Nutritional goals

Patients in the overweight and obese categories may have a low fat-free mass and, therefore, still be at nutritional risk or malnourished. Once a patient has been identified as being overweight (25 to 29 kg/m²) or obese (30 kg/m² and over),²⁴ it is important to determine their nutritional goals. Goals will vary depending on the severity and stability of their condition, risk of malnutrition and the presence of comorbidities (see the Flowchart). Schols and colleagues found fat-free mass to be an independent predictor of mortality irrespective of BMI.⁶ Therefore, all patients with an unintentional weight loss of 1 to 5 kg plus a reduced oral intake (MST score of 2 or more) are at risk of malnutrition and should be referred to a dietitian for more thorough assessment and individualised management (see Flowchart).

For overweight and obese patients with severe COPD who are not at risk of

malnutrition (Table 1), weight maintenance and lean muscle mass preservation may be the most appropriate goals. Prescott and colleagues found that patients with severe COPD and a BMI greater than 25 kg/m² had the best outcomes when they maintained their weight.²⁵ However, this study did not state the upper limit BMI in the obese category (30 kg/m² and above).

Patients in the overweight BMI category (25 to 29.9 kg/m²) with mild-to-moderate COPD who are not at risk of malnutrition (Table 1) may benefit from healthy lifestyle changes. These can be implemented and monitored by GPs in conjunction with community weight loss services or pulmonary rehabilitation programs (Table 2 and Flowchart).

Weight loss interventions for obese patients with COPD who are not at risk of malnutrition (Table 1) must aim to preserve fat-free mass to prevent the deleterious effects of reducing both fat and muscle mass.²⁶ Ensuring adequate protein intake while restricting total energy intake to facilitate weight loss is recommended to preserve muscle mass.²⁷ Accredited practising dietitians could consider multimodal weight reduction options including dietary, pharmacological and referral for surgical treatments.

Patients with abdominal obesity often have low protein intakes and most often consume a poor-quality diet with inadequate micronutrient intakes. van de Boel and colleagues found that 60% of patients with

COPD and abdominal obesity had inadequate and poor-quality protein intakes.¹⁶ They also found that more than one-third of patients had vitamin A, C and E intakes below the recommended levels and more than 75% of patients had inadequate vitamin D and calcium intakes.²⁷

Discretionary or ‘fast food’ items such as burgers, chips, lollies, chocolate, soft drink and alcohol are often high in saturated fats, sugar or salt, and low in micronutrients and protein.²⁸ *The Australian Guide to Healthy Eating* is a food selection guide that presents the recommended proportional intake of the five food groups for each day.²³ *The Australian Dietary Guidelines 1-5* provides dietary recommendations according to age and sex.²⁸ These resources recommend discretionary items be consumed only sometimes and in small amounts (Figure 2).²³

Pulmonary rehabilitation

Pulmonary rehabilitation is an effective therapy in the management of individuals with COPD.^{29,30} A diagnosis of obesity alone in the absence of COPD does not represent an indication for pulmonary rehabilitation.³¹

Evidence is emerging on the impacts of pulmonary rehabilitation on overweight and obese patients with COPD. A retrospective analysis of obese patients with COPD versus nonobese patients highlighted a reduced baseline 6-minute walk test (6MWT) distance or reduced weight-bearing exercise tolerance



Australian Guide to Healthy Eating

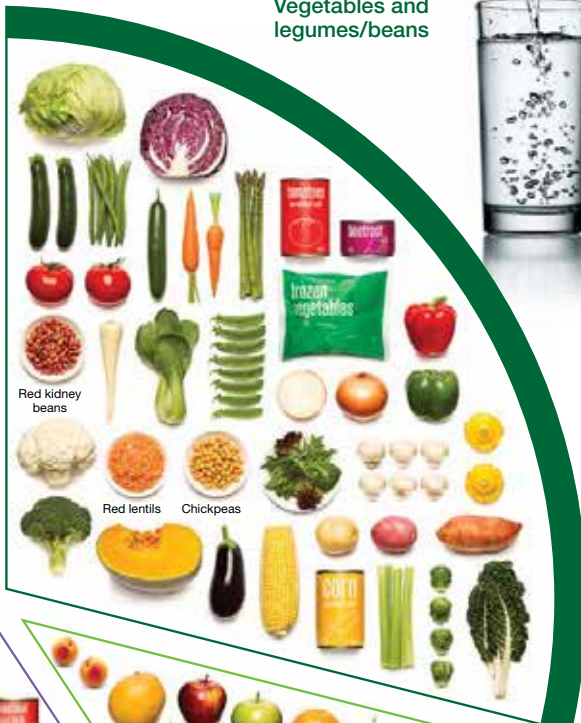
Enjoy a wide variety of nutritious foods from these five food groups every day.

Drink plenty of water.

Grain (cereal) foods, mostly wholegrain and/or high cereal fibre varieties



Vegetables and legumes/beans



Lean meats and poultry, fish, eggs, tofu, nuts and seeds and legumes/beans



Milk, yoghurt, cheese and/or alternatives, mostly reduced fat



Fruit



Use small amounts



Only sometimes and in small amounts



Figure 2. The Australian Guide to Healthy Eating.²³

Source: National Health and Medical Research Council.

in the obese subjects despite less severe airflow limitation.³² This may be explained in part by an increased weight burden on the lower extremities during exercise. Despite this, improvements in 6MWT distance and quality of life were reported after the program in both the obese and nonobese groups.³² A similar prospective study by Sava and colleagues reinforced these findings.³³ They found that quality of life, exercise capacity and dyspnoea all improved in the obese participants with COPD undergoing pulmonary rehabilitation compared with overweight (BMI 25 to 29.99 kg/m²) and healthy weight (BMI 18.5 to 24.99 kg/m²) individuals.³³

Optimal training protocols for obese patients with COPD remain unclear.³⁴ Pulmonary rehabilitation programs that include low-impact exercise, water-based therapies or a supervised walking program may optimise participation. McDonald and colleagues showed that use of resistance training combined with a low-energy diet (up to 5900 kJ for patients with BMI greater than 40 kg/m²) with adequate protein (1.2 to 1.5 g/kg of adjusted body weight) resulted in significant weight loss (mean BMI reduction of 2.4 kg/m² in 12 weeks). This was coupled with improved quality of life, improved exercise capacity, decreased dyspnoea and maintenance of skeletal muscle mass.³⁵ Currently, a multidisciplinary approach

is recommended to assist this patient cohort.

Management barriers and considerations

Socioeconomic and cultural factors are increasingly being recognised as important predictors of acute events and outcome in COPD, and should be considered in the management of all overweight and obese patients with COPD.

The perceived financial burden of healthy eating is an important predictor of behavioural change.³⁶ There is consensus that the relation between fast food accessibility and rising rates of overweight and obesity is directly influenced by the economics of food choice. Drewnowski and colleagues suggested consumers who have limited resources select energy-dense, low-protein diets that are high in added sugars and fats as an effective way to save money.³⁷

Socioeconomic status has been shown to influence treatment and management compliance, with social and economic factors found to disadvantage the outcomes of patients with COPD.³⁸ Food insecurity leads to poorer health status and decreased likelihood of individuals seeking medical treatment for their lung disease.³⁹

The burden of stigmas associated with chronic conditions can also prevent patients seeking appropriate care and support.³⁹ Puhl

and colleagues found consistent research that obese patients are stigmatised as their weight is perceived to be attributable to poor lifestyle choices.⁴⁰ The impact of this stigma on adherence with therapy is well documented.⁴⁰⁻⁴³

An understanding of the link between these considerations and clinical outcomes is necessary to develop practical and effective interventions.

Conclusion

The obesity paradox in patients with COPD has been overstated because losing weight has far more impact on mortality; overweight and obesity may therefore be less protective than first hypothesised. Coexisting COPD and obesity have been associated with decreased exercise tolerance and increased dyspnoea and cardiovascular risk. The management of overweight and obese patients with COPD presents complexities and new evidence is emerging in this area. Best results shown thus far have been obtained through a multidisciplinary approach including medical therapies, dietetics and physiotherapy. **RMT**

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A list of references is included in the online version of this article (www.respiratorymedicinetoday.com.au).

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