Developing a Nutritional Pathway for COPD Patients

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Chronic obstructive pulmonary disease (COPD) affects around 1.2 million people in the UK,[1] with a further 2.1 million living with undiagnosed COPD.[2] COPD is an incurable condition, posing a significant societal and economic burden, accounting for the use of >1 million bed-days each year.[3] Over £800 million yearly is spent by the National Health Service (NHS) in direct costs, and indirectly there are 24 million lost working days.[2] COPD is often accompanied by multiple comorbidities, such as malnutrition, which are associated with increased mortality risk. Low body mass index (BMI) is considered an independent prognostic factor for mortality in COPD patients.[4]

Nutrition in COPD patients

Malnutrition is common in COPD patients, resulting in up to 20% higher hospitalisation costs.[5] Up to 60% of inpatients and 45% of outpatients have been found to be at risk of malnutrition.[6] Weight loss is observed in 25–40% of all COPD patients, with 25–35% showing a reduced muscle mass (MM).[7] Equally prevalent and associated with low MM is muscle dysfunction, affecting strength, endurance and contributing to increased fatigability, mostly in lower limbs.[7] COPD patients have demonstrated 20-30% reduction in quadriceps muscle strength compared to healthy subjects.[8] One study involving approximately 264,000 patients showed that a BMI <18.5 kg/m^2 compared to a BMI of 25.0–29.9 kg/m^2 had a significantly higher mortality rate of 14.3% vs 4.3%.[9]

Low vitamin levels, especially vitamin D deficiency, have also been reported in more than 60% of COPD patients and are a risk factor for osteoporosis.[10] A cross-sectional study conducted in 414 COPD subjects demonstrated that low levels of vitamin D might be associated with worsening airflow obstruction,[11] with doses at 1200 IU daily showing effectiveness.[12] These patients also have increased muscle protein breakdown, low MM, and low plasma levels of branched-chain amino-acids (BCAAs), particularly leucine, a precursor to the metabolite β-hydroxy-β-methylbutyrate (HMB) which is known to stimulate muscle protein synthesis, and reduce protein breakdown.[13] Protein and calorie intake are significantly linked with muscle function, shown in reduced 6 minute walking test (6-MWT) and sit to stand (STS) tests[14, 15] and low handgrip strength.[16]

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Nutrition support for COPD patients

Malnourished COPD inpatients are likely to have longer hospital stays[17] and a higher probability of being readmitted[18] with an increase in healthcare costs.[19] A 24-month economic evaluation of a trial comparing oral nutritional supplements (ONS) with usual care in COPD patients with low MM demonstrated significant net savings per patient of €1,195 (95% CI -7905–5759).[20] A Cochrane Review of 17 trials demonstrated that ONS led to an increase in body weight (BW), raised MM and improved exercise tolerance.[21] Similarly, the NOURISH study, a double-blind randomised controlled trial of 652 hospitalised malnourished patients aged 65 years or older demonstrated the benefits of nutrition support in patients with cardiopulmonary (large numbers of COPD patients) disease.[22] Researchers compared the effect of a specialised ONS containing 20 g protein, 1.5 g HMB and 500 IU vitamin D and standard care to a placebo and standard care on rates of readmission or death 90-days post-discharge. The NOURISH study estimated that one life could be saved for every 21 patients who received the specialised ONS, showing improvements in BW, nutritional status, and vitamin D levels. Equally beneficial was the use of x2 ONS daily for 12 weeks in combination with an exercise regimen, resulting in an improvement in BW, MM, better 6-MWT, quadricep muscle force and maximum inspiratory pressure when compared to the control.[23]

Nutrition optimisation for COPD patients

Creation of care pathways, a standardised process flowchart, supports best nutrition practice, coordinated care, provides better experience for patients, and improves staff capacity through clearly established guidance and support in clinical decision making. Key steps[24] in creating a pathway are shown in **Figure 1**.

The nutrition management of patients is based on an iterative model where the key steps are part of a constant cycle of *screening, assessment, intervention, and monitoring;* these should be part of nutrition pathways (Example of a nutrition pathway – **Figure 2**).

Conclusion

Care pathways are typically in the form of a flow chart or process map, and will provide guidance for dietitians on best practice to support positive outcomes in a cost effective and consistent manner. Engagement from all relevant stakeholders is essential throughout the development process to ensure its usability and adherence.

Figure 1: Essential steps in the development of a clinical pathway

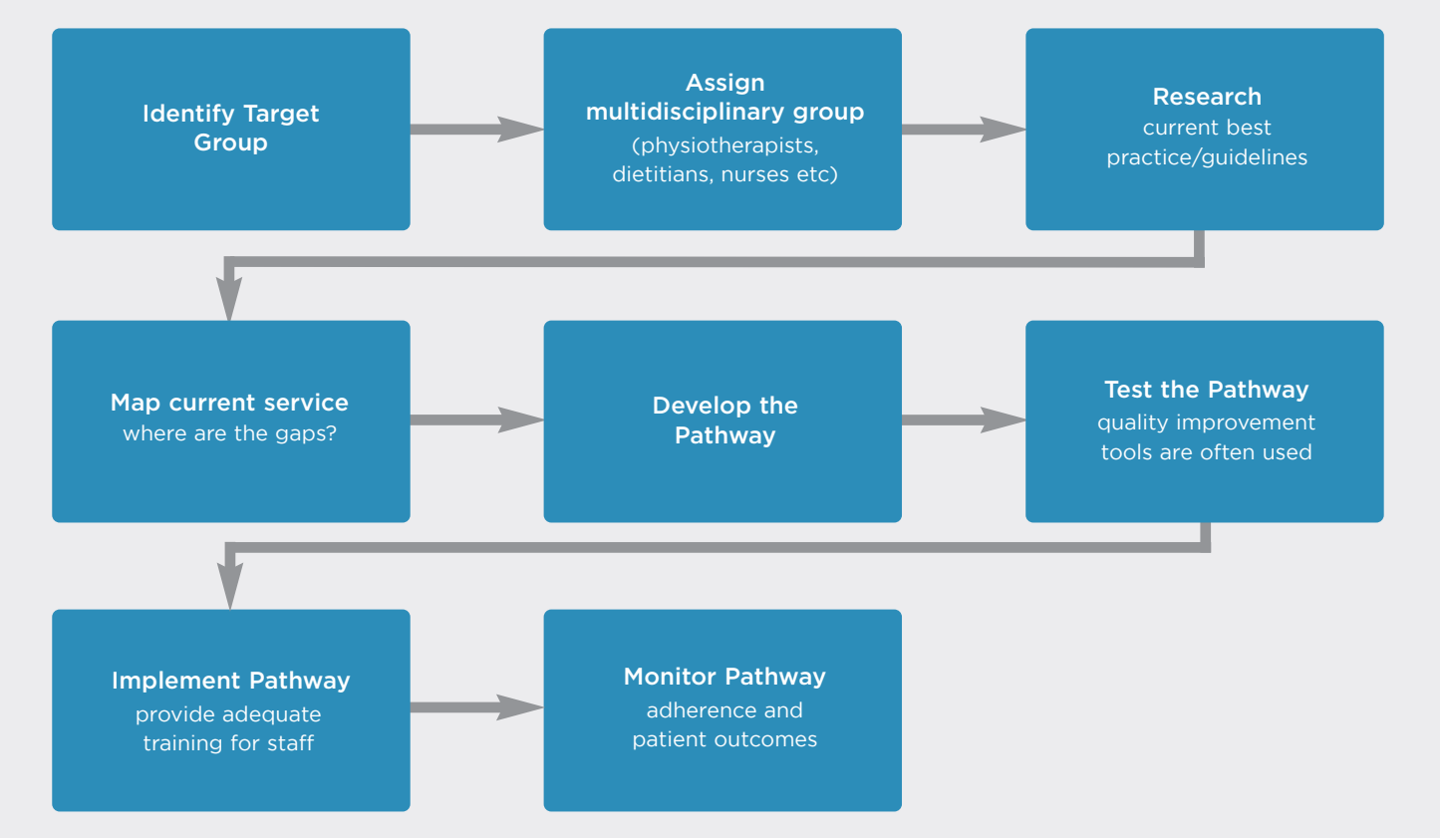
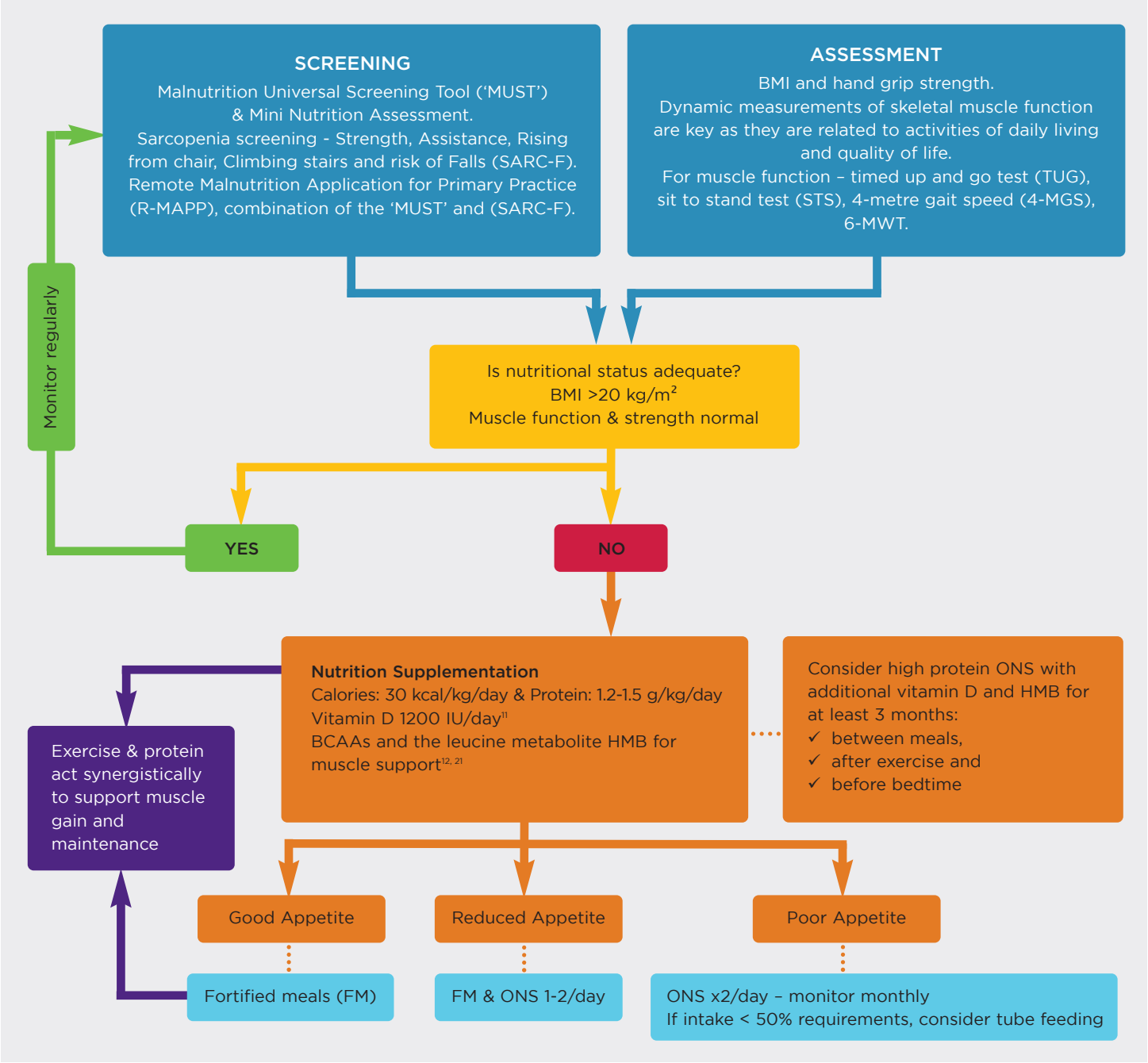


Figure 2: Example of a nutrition pathway in COPD



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