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A pragmatic, randomised controlled trial of a tailored pulmonary rehabilitation package in
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Background: Difficult-to-control asthma associated with elevated body mass index (BMI)
represents a significant challenge, with limited treatment options. The effects of pulmonary
rehabilitation (PR) in this population are uncertain.

Methods: This randomised controlled trial compared an asthma tailored PR programme to
usual care (UC) in participants with uncontrolled asthma and BMI ≥25 kg/m². PR comprised an
hour of education and of exercise each week for eight weeks. Primary outcome was difference
in change in Asthma Quality of Life Questionnaire (AQLQ) in PR versus UC groups post
intervention. Secondary outcomes included difference in change in other asthma outcomes
including asthma control questionnaire-6 (ACQ6), Medical Research Council (MRC) dyspnoea
score, six-minute walk distance (6MWD) and post-exercise Borg breathlessness score.
Responder analyses compared proportions reaching the minimum clinically important
difference (MCID) for AQLQ and ACQ6.

Results 95 participants were randomised 1:1 to PR or UC; median age was 54, with 60% female
and median BMI 33.8kg/m². 18 participants withdrew prior to second visit, meaning 77 were
included in analysis. Median (IQR) change in AQLQ was not significantly different: 0.3(-0.2 to
0.6) in PR and -0.1(-0.5 to 0.4) in UC, p= 0.139. There was no difference in proportion reaching
MCID for improvement in AQLQ: 13(39%) in PR and 10(23%) in UC, p=0.184. Mean change in
ACQ6 was significantly different: -0.4(95% CI -0.6 to -0.2) in PR and 0(-0.3 to +0.3) in UC,
p=0.015*. In ACQ6 responder analysis, MCID was reached by 18 participants in PR group
(54.5%) versus 10 in UC (22.7%), p=0.009*. Changes in MRC dyspnoea score (p=0.022*), 6MWD
(p=0.035*) and Borg breathlessness (p=0.015*) were significantly different in favour of PR. A
post-hoc analysis of PR group revealed baseline FeNO was significantly lower in ACQ6
responders (median (IQR) 18(8.5-41)) than non-responders (47(17-71)), p=0.020*; and in AQLQ
responders (14(8.5–44.5)) compared to non-responders (40(19–71)), p=0.038*.

Conclusion Pulmonary rehabilitation improves asthma control and reduces perception of
breathlessness in participants with difficult-to-control asthma associated with elevated BMI. It
should be considered as additional therapy for this group. Lower FeNO in PR responders suggests it may be of most value in type-2 low phenotype obese asthma.

Figure 1- Key results