Obesity in COPD: the effect of water-based exercise

To the Editor:

RUTTEN *et al.* [1] recently summarised the literature regarding obesity as a comorbidity in chronic obstructive pulmonary disease (COPD). Obesity in COPD has been associated with increased symptoms of dyspnoea [2], poorer health-related quality of life [2], increased levels of fatigue [3] and exercise performance limitations, including a decreased tolerance to weight-bearing exercise such as walking [4].

We have previously reported the results of a randomised controlled trial examining the effect of water-based exercise in 53 individuals with COPD with physical comorbidities, including obesity [5]. In order to contribute to the discussion on the impact of obesity in COPD we present additional data from the subgroup of 24 obese (defined as body mass index $\geqslant 32$ kg·m^{-2}) individuals with COPD in our trial. These 24 participants were randomised to either 8 weeks water-based exercise (n=8), land-based exercise (n=8) or control (no exercise) (n=8). Participant characteristics and body composition results are presented in table 1. Within-group comparisons using a paired t-test demonstrated that participants in the water-based exercise group lost the greatest amount of weight over the eight-week period (p=0.02) (table 1). Between-group comparisons using independent group t-tests found a significant difference in change in weight between the water-based exercise group and the control group (p=0.038). No nutritional or lifestyle interventions were provided as part of this study.

Within-group analysis showed that the water-based exercise group was the only group to achieve a significant improvement in exercise capacity following training with a mean±SD change in 6-min walking distance (6MWD) of 41±36 m, in incremental shuttle walk distance (ISWD) of 60±48 m and in endurance shuttle walk distance (ESWD) of 476±400 m (all p=0.01). In the land-based exercise group, the mean±SD changes for 6MWD, ISWD and ESWD were 35±44 m, 4±61 m and 108±263 m, respectively, all of which were non-significant. The control group had no significant changes in any of the exercise tests when 8-week measures were compared with baseline. Between-group comparisons showed that water-based exercise training significantly increased ESWD (p<0.05) when compared with land-based exercise training; and compared with control, water-based exercise training significantly increased 6MWD, ISWD and ESWD (p<0.01, p=0.05 and p=0.02, respectively).

At 8 weeks there was a significant improvement in all aspects of health-related quality of life, as measured by the Chronic Respiratory Disease Questionnaire (CRDQ), in the water-based exercise group (all p<0.05), but no significant changes in CRDQ scores in the land-based exercise training group or the control group. A significant difference was found for three domains of the CRDQ between the water-based exercise group and the control group (mean difference (95% CI): dyspnoea 6.1 (3.1–9.2); fatigue 5.5 (1.3–9.7); and mastery 2.6 (0.1–5.1)). Compared with land-based exercise training, water-based exercise training significantly improved (mean difference (95% CI)): dyspnoea 4.9 (1.4–8.3), p<0.01; fatigue 4.6 (1.0–8.2), p=0.01; and mastery 2.5 (0.2–4.8), p=0.03.

Enjoyment of the exercise sessions was measured on a five-point scale ranging from 0 "no enjoyment at all" to 5 "complete enjoyment". A significant between-group difference was found between the water- and land-based exercise groups (p<0.01) regarding level of enjoyment. The water-based exercise group mean±SD rating was 4.9±0.4 whilst the land-based exercise group mean±SD rating was 3.4±1.2 (mean difference (95% CI) 1.5 (0.6–2.4); p<0.01).

In this study of obese people with COPD, an 8-week water-based exercise training programme reduced body weight and improved exercise capacity and health-related quality of life more than a similar land-based exercise training programme. Previous studies have reported the effect of land-based exercise training in people with COPD with concurrent obesity; however, this is the first report of the effect of water-based exercise training compared with land-based exercise or no exercise on body weight in people with COPD and obesity. To our knowledge, the only other study to report change in body weight was by SAVA *et al.* [4], who reported a non-statistically significant average change in body mass index of -0.03±0.98 kg·m^{-2} following a 6–12 week land-based pulmonary rehabilitation programme. Existing reports examining land-based exercise training have concluded that the increased burden of obesity in COPD does not reduce the magnitude of the effect of pulmonary rehabilitation on exercise capacity or quality of life [3, 4]. Our

TABLE 1 Participant characteristics and weight results

	Water-based exercise group	Land-based exercise group	Control group
Subjects	8	8	8
Age years	69±11	69±5	72±7
Males/females	3/5	5/3	4/4
Pulmonary function			
FEV_1 L	1.31±0.31	1.57±0.58	1.44±0.35
FEV_1 % pred	61±11	62±17	62±9
FVC % pred	84±17	86±22	88±16
FEV_1/FVC %	60±8	57±8	56±8
TLC % pred	93±17	89±16	97±14
VC % pred	84±13	88±12	85±13
RV % pred	103±28	96±29	120±30
D_{LCO} % pred	70±13	54±20	71±13
MIP % pred	81±20	76±19	84±35
MEP % pred	66±21	54±17	55±14
GOLD stage			
I	0	0	0
II	6	6	7
III	2	1	1
IV	0	1	0
Baseline BMI kg·m^{-2}	37.9±4.5	36.0±3.0	37.0±4.2
Baseline weight kg	99.0±19.4	101.1±13.3	101.4±13.4
Post-intervention weight kg	97.2±18.9	100.7±17.1	101.9±14.6
Change in weight kg	-1.8±1.7	-0.4±4.6	0.5±2.3

Data are presented as n or mean±SD. All values are post-bronchodilator. FEV_1: forced expiratory volume in 1 s; % pred: % predicted; FVC: forced vital capacity; TLC: total lung capacity; VC: vital capacity; RV: residual volume; D_{LCO}: diffusing capacity of the lung for carbon monoxide; MIP: maximal inspiratory mouth pressure; MEP: maximal expiratory mouth pressure; GOLD: Global Initiative for Chronic Obstructive Pulmonary Disease; BMI: body mass index.

land-based exercise group results do not concur with this. More interestingly, our water-based exercise training group achieved improvements in exercise capacity and health-related quality of life which far exceeded the changes found following land-based exercise training, despite the similar intensity, frequency, duration and exercises prescribed for the water- and land-based programmes during the training period. As reported in our published trial [5], we believe the effect of reduced weight-bearing in water combined with the increased resistance against movement in all directions in the water enabled the water-based exercise group to exercise at a higher self-perceived level of intensity. This higher exercise intensity, combined with the warmth of the water and the hot ambient air temperature, may have contributed to the weight loss in the water-based exercise group.

It is important to note that the majority of participants in this study had mild COPD (Global Initiative for Chronic Obstructive Pulmonary Disease stage II). The association of mild COPD with obesity is similar to findings from a study in the Netherlands, where obesity was found to be more prevalent in people with mild COPD than in those with severe disease [6]. Despite less airflow limitation, people with COPD and obesity reported greater symptoms of dyspnoea and exercise limitation due to the increased weight burden [7]. Pulmonary rehabilitation, incorporating supervised exercise training and nutritional support, should, therefore, be a major component in the clinical management of these patients as it has been shown to improve symptoms, exercise tolerance, body composition and health status [8]. Weight reduction may be associated with symptomatic improvement, as has been shown in people with asthma [9].

In summary, the water environment provided an acceptable and effective alternative mode of exercise training suitable for people with COPD with concurrent obesity. Future studies examining the effect of water-based exercise combined with nutritional intervention would contribute further to our knowledge about the comprehensive management of individuals with COPD and obesity.

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Water exercise reduces body weight and improves exercise capacity and quality of life in obese people with COPD http://ow.ly/o7uZ3

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Burden of community-acquired pneumonia in Italian general practice

To the Editor:

Community-acquired pneumonia (CAP) is a major respiratory health disease with high prevalence in the general population, clinical heterogeneity and different degrees of severity. In both the USA and Europe, CAP is the most frequent cause of infection-related death. Its incidence varies from country to country and from study to study, and it is higher in very young children and elderly persons [1]. A recent UK study documented an increase of 34% in hospital admissions due to CAP over the past decade [2].

Despite the importance of its social impact, actual incidence of CAP in different settings is still under scrutiny. Thus, we aimed to explore the epidemiology of CAP in Italian general practice.

We collected data from the Health Search - CSD Patient Database (HSD), an electronic general practice database, representative of the Italian general population, which was set up in 1998 by the Italian College of General Practitioners (Florence, Italy). The HSD contains data from approximately 1.2 million inhabitants under the care of 800 general practitioners (GPs), homogenously distributed across Italy. All clinical diagnoses are coded according to the International Classification of Diseases 9th Revision (ICD-9). Drugs are coded according to the Anatomical Therapeutic and Chemical classification system. The HSD has been extensively used for pharmaco-epidemiologic research [3].

Patients recruited between January 1, 2005 and December 31, 2009 were eligible if aged $\geqslant$15 years with clinical records in the database spanning a minimum duration of 2 years and an ICD-9-based incident diagnosis of CAP. The first date of CAP diagnosis was defined as the index date.