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S93 THE DEVELOPMENT OF A NOVEL SCALE TO SCREEN AND MEASURE ANXIETY IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

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Introduction and objectives Comorbid anxiety disorders are common among patients with COPD, affecting up to half of all patients. Comorbid anxiety may be a significant factor in predicting quality of life, yet recognition and management of anxiety among this patient group is poor. Screening and measuring symptoms of anxiety can be challenging due to the overlap of physical symptoms and the lack of a validated disease-specific tool. The aim of this study was to develop a novel non-somatic scale (Anxiety Inventory for Respiratory disease (AIR)) to screen and measure anxiety in patients with COPD.

Methods This study utilised a multi-method approach to scale development incorporating both qualitative and quantitative methods. An item pool was developed using in-depth interviews with COPD patients who exhibited symptoms of anxiety (n=14), and the analysis of existing anxiety scales. Item wording, content and user-friendliness were checked by an expert reference group (ERG) that included clinicians and patients. This item pool was tested on a group of COPD patients (n=82). The Likert-type scale has four consistent responses to statements (Not at all, Occasionally, Frequently, Almost all of the time) that are scored from 0 to 3. Item and factor analysis were carried out to aid in item reduction and to explore the factor structure.

Results Sixteen items were selected for inclusion following development and approval from the ERG. Items were retained based on item-to-total correlation analysis and α-if-item-deleted analysis. One item was discarded as it had a corrected-item-to-total correlation of <0.55. Exploratory principal component factor analysis was performed and three further items were removed due to low communalities (<0.50). Secondary analysis indicated a single factor solution accounting for 66.67% of total variance with a mean communality of 0.67. Abstract S93 table 1 shows the factor loadings for the final items. The 12-item scale had a mean total score of 13.55 (SD=9.41, range=0–36), and a Cronbach's α of 0.95.

Conclusions The AIR is a short self-report non-somatic anxiety scale with a clear uni-dimensional factor solution and high internal consistency. Additional studies are warranted to further explore the scale's psychometric properties and to establish its ability to screen for clinical anxiety disorders.

Abstract S93 Table 1   Factor loadings for the 12-item Anxiety Inventory for Respiratory disease (AIR)

	Item	Factor 1 loading
1	I have felt tense, restless or wound-up	0.71
2	I have found it difficult to concentrate on things, such as watching TV or reading	0.71
3	I have had worrying thoughts going through my mind	0.83
4	I have felt frightened or very panicky	0.85
5	I have felt worked up and/or upset	0.78
6	I have had a fear of losing control and/or falling apart	0.82
7	I have worried about experiencing panic	0.88
8	I have found it hard to relax	0.77
9	I have had sudden and intense feelings of fear and/or panic	0.86
10	I have felt generally anxious	0.85
11	I have had thoughts that something bad might happen	0.83
12	I have felt nervous or on-edge	0.89

S94 ULTRASOUND MEASUREMENT OF QUADRICEPS WASTING IN EARLY CHRONIC OBSTRUCTIVE PULMONARY DISEASE AND ITS RELATIONSHIP WITH DAILY PHYSICAL ACTIVITY

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Introduction Quadriceps weakness is recognised as an important complication of COPD but few data exist about loss of muscle bulk in early disease. We hypothesised that quadriceps wasting, measured by ultrasound rectus femoris cross-sectional ($USRF_{CSA}$), would be observed in patients with mild COPD compared to healthy age-matched subjects and that this would correlate with daily physical activity levels.

Methods Rectus femoris cross-sectional area was measured using ultrasound ($USRF_{CSA}$) and daily physical activity (step count and physical activity level—PAL) recorded using a multisensor biaxial armband accelerometer. Fat free mass index (FFMI) and the impedance ratio (Z_{200}/Z_5) were determined by bioelectrical impedance analysis. Quadriceps maximum voluntary contraction (QMVC) was used as a measure of strength.

Results 150 patients with stable COPD, GOLD stage I (n=38), II (n=38), III (n=37) and IV (n=37), mean (SD) age 66 (9) years, 54% male and 40 age-matched healthy subjects participated in the study.
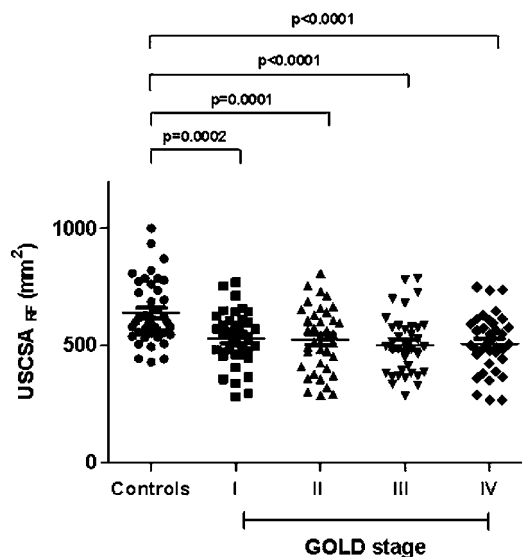
Abstract S94 Figure 1   Ultrasound rectus femoris cross-sectional area vs GOLD stage in COPD patients and healthy controls (ANOVA analysis—no significant difference between I and IV).

USRF$_{CSA}$ was significantly reduced in stage I COPD patients compared to controls (530 mm^2 vs 640 mm^2; p=0.0002) (Abstract S94 figure 1); USRF$_{CSA}$ was also reduced in stages II (526 mm^2), III (503 mm^2) and IV (509 mm^2) disease (p=0.0001). Daily physical activity was reduced in stage I patients (steps; p<0.0001, PAL; p=0.002) and stage II–IV COPD (steps and PAL; p<0.0001) compared to healthy subjects. Using multivariate linear regression, USRF$_{CSA}$ (p=0.0003), FFMI (p=0.0003) and the impedance ratio (p=0.001) were all independent predictors of quadriceps strength in COPD. In stage I patients, only USRF$_{CSA}$ was shown to be independently associated with daily physical activity (steps, p=0.03; PAL, p=0.003), while in stage II–IV disease, FEV$_1$% predicted was retained as the only independent correlate with daily physical activity (steps and PAL, p<0.0001).

Conclusions Quadriceps wasting identified by USRF$_{CSA}$ exists in patients with early, as well as advanced, COPD when compared to healthy age-matched controls. Quadriceps bulk is associated with daily physical activity independent of airflow obstruction, in early but not advanced disease. Our data suggest that, rather than being an end-stage phenomenon, quadriceps wasting is present in a substantial minority of COPD patients and is related to physical inactivity in the absence of severe airflow limitation.

S95 | **EFFECT OF PULMONARY REHABILITATION ON CARDIOVASCULAR RISK FACTORS IN COPD**

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Background Cardiovascular disease accounts for 27% of excess mortality seen in patients with chronic obstructive pulmonary disease (COPD). This may be attributed to the coexistence of cardiovascular risk factors such as smoking exposure and physical inactivity. Increased arterial stiffness has been demonstrated in patients with COPD, and this is an independent predictor of adverse cardiovascular events. Recent studies have shown that pulmonary rehabilitation (PR) can reduce blood pressure and arterial stiffness in COPD patients (Vivodtzev et al, 2009; Gale et al, 2011). However these studies comprised small numbers of highly selected patients. We investigated the effect of PR on resting blood pressure and heart rate in an unselected COPD population.

Methods 179 consecutive COPD patients completing an 8-week outpatient pulmonary rehabilitation programme were recruited. Resting blood pressure, heart rate, incremental shuttle walk (ISW) and Chronic Respiratory Disease Questionnaire (CRDQ) were measured immediately before and after PR. Paired t test (or non-parametric equivalent) was used to test the effect of PR.

Results Following PR, there was no significant change in systolic, diastolic, mean arterial pressure and heart rate in all patients with COPD, although ISW and CRDQ improved significantly (see Abstract S95 table 1). Subset analysis in 124 COPD patients with no coexisting cardiovascular disease, diabetes or malignancy, and 31 patients with known hypertension also showed no significant change in blood pressure or heart rate.

Conclusions An 8-week outpatient PR programme has no effect upon resting heart rate or blood pressure in unselected patients with COPD.

S96 | **SURVIVAL AFTER THE FIRST MYOCARDIAL INFARCTION IS SHORTER IN PATIENTS WITH COPD COMPARED TO THE GENERAL POPULATION**
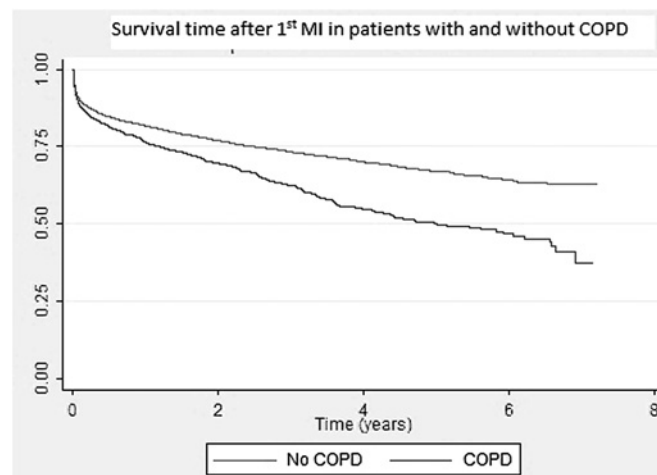
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Background Patients with COPD are at increased risk of myocardial infarction (MI) compared to the general population and have shorter survival after any MI. We investigated whether this held true in patients with an "unanticipated" MI, defined as an MI occurring as the first manifestation of atherosclerotic disease _and_ without any traditional cardiovascular risk factors _and_ without any prior chest pain.

Methods All patients experiencing their first MI between 1st January 2003 and 31st December 2008 as recorded in Myocardial Ischaemia National Audit Project (MINAP), who had no previous evidence of MI in their General Practice Research Database (GPRD) or MINAP record were included. Patients under 18 years of age, not registered with GPRD at the time of MI, or with <1 year of standard follow-up before their MI were excluded. Data were provided by the "Cardiovascular Disease Research Linking Bespoke Cohorts and Electronic Records" (CALIBER) group at UCL. The primary exposure of interest was diagnosis of COPD (defined in GPRD) and the outcome death after MI. Survival analysis was done using Kaplan–Meier methods. Cox proportional hazards models were used to adjust for potential confounders (age and sex).

Results 8065 individuals were included, 968 (12%) of whom had a physician diagnosis of COPD made either before the first MI or during the follow-up period. 87 patients died on the day of admission 10 (11.5%) of whom had COPD. The overall mortality rate was 160.2 deaths (95%CI 145.5 to 176.5) per 1000 person years in those with COPD compared to 99.4 deaths (95.2 to 103.9) per 1000 person

Abstract S95 Table 1 Effect of PR on haemodynamic variables in patients with COPD

	Before PR mean	After PR mean	Mean difference (95% CI)	p Value
Systolic BP (mm Hg)	138.7	138.6	−0.0(−2.7 to 2.6)	ns
Diastolic BP (mm Hg)	86.2	86.0	−0.1 (−10.8 to 1.6)	ns
MAP (mm Hg)	103.7	103.6	−0.1 (−1.8 to 1.6)	ns
Heart rate (bpm)	81.8	80.8	−1.0 (−2.7 to 0.6)	ns
ISWT (m)	203.4	262.6	60.5 (48.6 to 72.5)	<0.0001
CRDQ	74.5	91.2	16.7 (13.9 to 19.5)	<0.0001

Abstract S96 Figure 1 Survival time after 1st MI patients with and without COPD.