Online material (online supplement)

Interventions to modify physical activity in patients with COPD: a systematic review

Leandro Cruz Mantoani, Noah Rubio, Brian McKinstry, William MacNee, Roberto A Rabinovich.

Online supplement 1: Protocol of the Systematic Review

Online supplement 2: Search terms used in the search strategy

Online supplement 3: The use of harvest plot in data synthesis

Online supplement 4: The use of GRADE to assess the quality of included studies

Online supplement Table S1: Characteristics of the patients, performed interventions and methods to measure physical activity for the 60 included studies

Online supplement Table S2: Reasons for excluding studies from the final analysis after full text assessment

Online supplement Table S3. Sample size, presence of randomisation and blinding in the included studies.

Online supplement 1: Protocol of the Systematic Review

"Interventions able to increase physical activity levels in patients with COPD" This protocol was created and approved by the authors in April/2014.

Authors: Leandro Cruz Mantoani; Noah Rubio; Brian McKinstry; William MacNee; Roberto A Rabinovich.

Background

This systematic review will be conducted to review current evidence on which types of interventions can increase physical activity in daily life (PADL) of patients with COPD. As the association between daily physical activity and COPD has generated growing scientific interest, two systematic reviews (Gimeno-Santos, 2014 and Vaes et al, 2013) were published recently in this field. Gimeno-Santos et al (2014) tried to elucidate what are the determinants and outcomes of physical activity (PA) in COPD, as well as to summarize studies assessing associations between PADL and COPD. Vaes et al (2013) summarized studies that have investigated the effects of physical activity monitor counselling on PA and health-related outcomes in chronic diseases. Both systematic reviews were well designed and conducted and generated good scientific knowledge. However, there is a need of a systematic review specifically based on interventions that are able to increase PA levels in COPD.

As far as we know, there are no published studies systematically reviewing in depth the types of interventions that can increase daily physical activities in COPD patients. Hence, the aims of the present systematic review are to identify and to summarize interventional studies that have assessed PADL as an outcome in patients with COPD.

General Objectives (if possible):

1) To identify and to summarize the interventions able to increase PADL in patients with COPD;

2) To identify which of the interventions able to modify physical activity levels in COPD have the higher impacts on PA in this population;

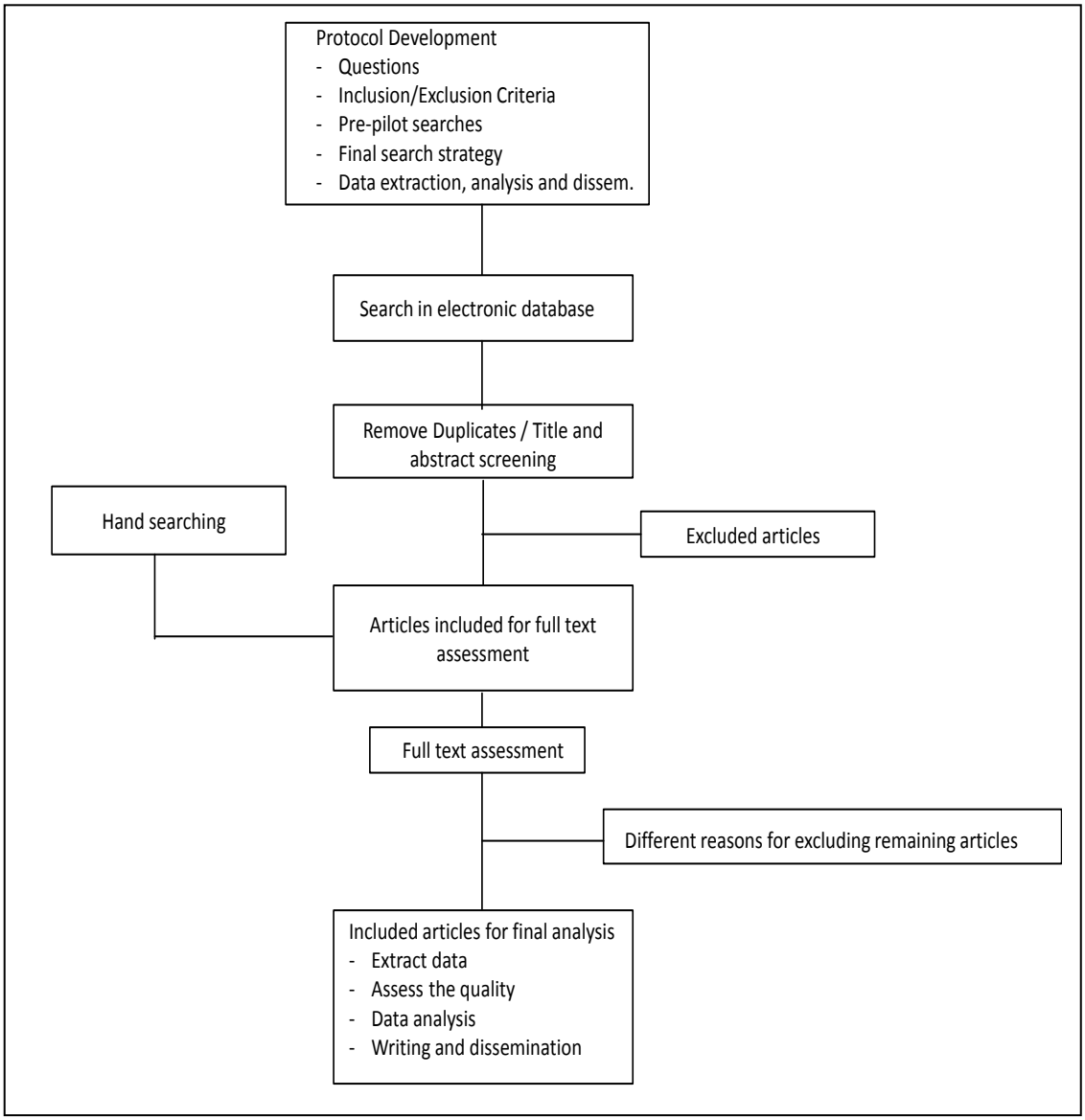
3) To assess the differences between those interventions on PA levels in stable and exacerbated COPD patients;

4) To identify which and how many of the interventional studies have assessed PA with objective or subjective measurements;

5) To evaluate the quality of evidence in interventional studies that have assessed physical activity in COPD patients.

Methods

We will follow standard procedures for the methodology, report and dissemination of the systematic review. For this, the PRISMA statement and the handbook of the Centre for Reviews and Dissemination (York, UK) will be used. Since we are planning to include studies other than RCT's and we believe the heterogeneity amongst included studies will be high, we plan to use the GRADE system to rate the quality of retrieved data. The 'PRISMA' figure below illustrates how will work the whole review process, step by step.



Eligibility and exclusion criteria:

Eligible studies will be included in this systematic review if they fulfilled the following criteria:

1) Population/participants: patients with COPD defined by spirometry (FEV1/FVC <0.7);

2) Study design: (I) prospective longitudinal studies; (II) randomized and non-randomized clinical trials: both arms (intervention + control) if the outcome was physical activity; (III) cohort studies; and (IV) experimental or pilot studies of any type of intervention targeting increasing physical activity in patients with COPD;

3) Interventional studies that has assessed physical activity as an outcome, defined as "any bodily movement produced by skeletal muscles that results in energy expenditure" (Caspersen, 1985).

Exclusion criteria will be articles in non-English language, review articles, notes, editorials, qualitative studies, and congress abstracts.

Outcomes:

The primary outcome of this review is physical activity. Its definition will be broadly considered. Therefore, studies measuring PA levels both objectively (multisensors, activity monitors, pedometers, etc) and/or subjectively (scales, questionnaires or scores) will be considered in this review.

Search strategy:

Pre-pilot searches: we will perform some pre-pilot searches before the final search strategy is done. This will allow us to have a good final search strategy, as well as to check what search terms are the best to include the majority of the studies available in the current literature. Therefore, we will start our search with only a few terms in each of the PICO category. Then we will amplify the number of search terms used in PICO and try to achieve an ideal search strategy. We will choose the search strategy that has the higher amount of possible included studies (based on 'milestones studies' in the two reviews and our previous knowledge in the topic) with the lower total number of studies. Afterwards we will run the final search strategy in the 5 different databases (Medline, Embase, CINAHL, Web of Science and PsycINFO).

Final search strategy: our final search strategy is very likely to be something in this line (please, see below).

((((("chronic obstructive pulmonary disease" OR copd OR "chronic lung disease" OR "chronic obstructive lung disease" OR emphysema OR "chronic bronchitis")) AND ("exercise training" OR "pulmonary exercise training" OR "physical exercise training" OR "pulmonary rehabilitation" OR "exercise rehabilitation" OR "cardiopulmonary rehabilitation" OR "rehabilitation program?" OR "exercise program?" OR "physical activity advice" OR "physical activity counselling" OR acceleromet? OR pedometer OR "activity monitor?" OR "step count?" OR actigraph? OR telerehabilitation OR "e-Health intervention" OR "dietary intervention" OR "dietary counselling" OR "dietary supplementation" OR "dietary fortification" OR "food fortification" OR "food supplementation" OR "food counselling" OR "nutritional intervention" OR "nutritional supplementation" OR "nutritional counselling" OR "nutritional fortification" OR "oxygen therapy" OR "long-term oxygen therapy" OR hypoxaemia OR "oxygen concentrator" OR "ambulatory oxygen" OR bronchodilators OR "long-acting β-agonist" OR salbutamol OR "short-acting β-agonist"))

AND ("physical activity" OR "motor activity" OR "activity of daily living" OR "physical inactivity" OR "risk factors" OR "outcome assessment" OR activit? OR "energy expenditure" OR step* OR walk? OR "daily steps count"))

Bibliographic details of retrieved data:

We will store the details of all articles from the different databases in a reference managing software (EndNote X7, Thomson Reuters, NY) file. We can then use a simple symbol system in EndNote to record our decision on inclusion or exclusion for each article.

Study selection

Two independent reviewers (LM and NR) will screen the titles and abstracts of every citation against the inclusion criteria. Their decision on including or excluding all the retrieved articles will be recorded in EndNote (using the mentioned symbol system) and potentially eligible articles will be highlighted and retrieved for full text evaluation. The same independent reviewers will assess the remaining articles and make a decision on inclusion or exclusion based on the eligibility criteria. Any persistent disagreements between the reviewers will be solved by a third independent reviewer (RR). We will record the bibliographic details of all excluded studies with the specific reasons for excluding them from the final analysis and this could be implemented in a possible online supplement (if the review has good results to be published).

Removing the duplicates:

We will treat multiple studies present in the 5 different databases as a single unit. All the duplicates in the retrieved data will be excluded.

Data extraction, quality assessment and data synthesis:

From each included study, two reviewers (LM and NR) will extract and record the following information in an excel file: authors, journal, year of publication, study design, setting, sample size, blindness, patient characteristics (gender, age, FEV1, BMI), interventions (type, frequency, intensity and duration), physical activity measurements, outcomes and results.

We intend to include a wide range of studies showing the interventions able to increase PA levels in COPD. Therefore, we will probably have a high heterogeneity amongst included studies. Since we are planning to include studies other than RCT's, we plan to use the GRADE system to rate the quality of retrieved data. This is a transparent and "subjective" rating system that can assess the overall quality of a body of evidence, but does not rate each study as a single unit. Consequently our judgment on the quality of the evidence across included studies will be based on each group of studies of the different interventions able to increase PA levels in patients with COPD. Two reviewers (LM and RR) will assess the quality of evidence and categorize them accordingly (high, moderate, low or very low).

If the retrieved data is homogenous, we will try to analyse the different interventions by using a meta-analysis with the graphic display of a forest plot.

Pre-defined Timeline:

Writing up and defining the final protocol: 15/04/2014.

Starting electronic database search (pre-piloted searches): 20/04/2014.

Final search in electronic database: 15/05/2014.

Title and abstract screening: 15/07/2014.

Full text assessment: to be defined.

Data extraction, quality assessment and data synthesis: to be defined.

Amendment made to the protocol on 24th September 2014:

If the data presented in the current systematic review is heterogeneous (i.e. wide range of different interventions to modify PA) and precludes a meta-analysis with the use of a forest plot, we will graphically summarise our findings using harvest plots of retrieved data (Ogilvie 2008).

Online supplement 2: Search terms used in the search strategy

As explained before, our search strategy included a wide variation of the evidence for treatments to modify levels of physical activity in COPD[1] (e.g. exercise training, physical activity advice, dietary intervention, long-term oxygen therapy and long-acting beta agonist). For that reason, we used the following terms in our literature search: “physical activity" OR "motor activity" OR "activity of daily living" OR "physical inactivity" OR "risk factors" OR "outcome assessment" OR activity OR "energy expenditure" OR step* OR walk* OR "daily steps count" AND "exercise training" OR "pulmonary exercise training" OR "physical exercise training" OR "pulmonary rehabilitation" OR "exercise rehabilitation" OR "cardiopulmonary rehabilitation" OR "rehabilitation program*" OR "exercise program*" OR "physical activity advice" OR "physical activity counseling" OR accelerometer OR pedometer* OR "activity monitor*" OR "step count*" OR actigraph* OR telerehabilitation OR "e-Health intervention" OR "dietary intervention" OR "dietary counseling" OR "dietary supplementation" OR "dietary fortification" OR "food fortification" OR "food supplementation" OR "food counseling" OR "nutritional intervention" OR "nutritional supplementation" OR "nutritional counseling" OR "nutritional fortification" OR "oxygen therapy" OR "long-term oxygen therapy" OR hypoxaemia OR "oxygen concentrator" OR "ambulatory oxygen" OR bronchodilators OR "long-acting beta-agonist" OR salbutamol OR "short-acting beta-agonist" AND "chronic obstructive pulmonary disease" OR copd OR "chronic lung disease" OR "chronic obstructive lung disease" OR emphysema OR "chronic bronchitis" AND “randomized controlled trial” OR “clinical trial” OR “experimental study” OR “cohort study” OR “longitudinal study” OR “pilot study” AND Human.

Online supplement 3: The use of harvest plot in data synthesis

The harvest plot is a method for synthesizing the data through a visual display, making it easier for the readers to assimilate the content of the findings. It gives researchers the possibility of combining the data from different studies that would not be possible to combine in a forest plot analysis. The harvest plot can be used in different contexts[2,3] and its applicability has received further use[2]. The graphical display of the harvest plot in the present review can be found in figure 2. In this figure, A represents studies with less than 30 patients; B represents studies with 30-60 patients; C represents studies with more than 60 patients. Big size bars represents RCTs, medium size bars represents non-RCTs, and small size bars represents pilot/experimental studies. White and grey bars characterize studies with subjective and objective measurement of physical activity, respectively; black bars characterize studies that used both types of physical activity assessment. The numbers on top of each bar represents studies' reference number in the present systematic review.

Online supplement 4: The use of GRADE to assess the quality of included studies

As stated in the main text of the present systematic review, we used the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) approach to assess the quality of included studies. GRADE is an approach that rates the overall quality of a body of evidence instead of rating each study as a single unit. Therefore our judgment on the quality of the evidence across the included studies was based on each group of studies of the different interventions to modify PA levels in patients with COPD (i.e. exercise training category).

The quality of the evidence is basically categorized in four different groups: high, moderate, low or very low. Usually, the body of the evidence for each identified intervention category starts with high (++++ = high confidence between true and estimated effect) quality level on GRADE and is downgraded for specific reasons. Very low quality (+) evidence is the lowest score for a body of evidence. It means there is very little confidence in the estimate effect and more studies are very likely to change the estimate.

As mentioned before, there are specific reasons to downgrade the score in GRADE. Thus, our judgment was based on these reasons which include:

1) Risk of bias: this includes limitations with the design and the execution of the study. Most common reasons to downgrade the GRADE based on this criterion is insufficient or incorrect randomisation, major loses to follow up and lack of blinding.
2) Inconsistency: this includes limitations on the outcomes of the study, particularly if the outcomes are heterogeneous and display a great deal of variability.
3) Indirectness: this is related as to whether there is directness or not across studies. It can occur with the interventions, if they are not identical; with the population, if they do not have the same characteristics (age, gender, disease severity); or with the outcomes, if some are compared in short and others in long term.
4) Imprecision: this will occur if there are few events, the confidence intervals are too wide or the sample size is too small.
5) Publication bias: this usually happens when there is high probability of unreported studies, especially due to negative/lack of impacting results.

Despite being a transparent and reproducible approach, GRADE has some limitations. The most important for the present systematic review is that this method has always a subjective component on the judgment of the quality of the evidence and does not eliminate any disagreement that might exist between two people when analysing a piece of evidence. This could be relevant when considering the scores of the body of evidence presented in this review.

Online supplement table S1. Patients' characteristics, performed interventions and methods of measurement of physical activity for the 60 included studies.

Reference	n	Study group characteristics			Methods to measure Physical Activity		Intervention(s)
		Gender (male), n (%)	Age (yr), mean (SD)	FEV_1 (%pred), mean (SD)	Objective	Subjective	
Altenburg, WA. 2015, Respir Med	TG: 78 CG: 77	– –	– –	– –	Pedometer Yamax Digi-Walker SW-200; Tokyo, Japan	– –	TG: 12-weeks' customized lifestyle physical activity counselling programme designed to enhance physical activity in COPD (activities in daily life, including leisure time, occupational and household activity) with the use of a pedometer every day. CG: Usual care.
Barberan-Garcia, A. 2013, Respir Med	G1: 51 G2: 26 G3: NA G4: NA G5: 25 G6: 15	G1: 46 (90) G2: 24 (92) G3: NA G4: NA G5: NA G6: NA	G1: 66 (9) G2: 64 (6) G3: NA G4: NA G5: 67 (8) G6: 65 (5)	G1: 43 (16) G2: 56 (14) G3: NA G4: NA G5: 44 (12) G6: 41 (10)	– –	Non validated self-reported physical activity questionnaire.	In all groups, patients underwent a supervised cardiopulmonary rehabilitation programme over 8 weeks followed by the use of an integrated telehealth care service (G1, G3, G5) or usual care (G2, G4, G6) over at least one year.
Bauldoff, GS. 2002, Chest	EG: 12 CG: 12	4 (17)	68 (8)	EG: 40 (16) CG: 42 (10)	Pedometer (Model 342; Sportline; Campbell, CA)	Daily Logs	EG: Post-PR programme maintenance training with Distractive Auditory Stimuli (portable audiocassette playing music) during walking, 20-45 min/day, 2-5 days/week. CG: Same as EG but with no Distractive Auditory Stimuli.

Behnke, M. 2005, Respir Med	TG: 66 CG: 22	TG: 51 (77) CG: 20 (91)	TG: 61 (9) CG: 58 (7)	TG: 42 (14) CG: 47 (15)	Accelerometer: Trictrac-R3D; Stayhealthy, Monrovia, CA, USA	_ _	TC: 10-day hospital-based supervised training program, comprising a 6 minute treadmill distance and 5 walking sessions per day. CG: Usual care.
Bendstrup, KE. 1997, Eur Respir J	TG: 16 CG: 16	TG: 9 (55) CG: 9 (56)	TG: 64 (3) CG: 65 (2)	_ _	_ _	Activities of Daily Living score specific for COPD (Ogden, 1985)	TG: Programme composed by exercise training 3x/week over 12 weeks plus occupational therapy, education and smoking cessation sessions. CG: Usual care.
Berry, M. 2010, Respir Med	G1: 89 G2: 87	G1: 48 (54) G2: 47 (54)	G1: 66 (10) G2: 66 (10)	G1: 53 (19) G2: 51 (20)	_ _	The Community Health Activities Model Program for Seniors (CHAMPS) (Stewart, 2001)	G1: One-hour exercise training session 3x/week over 12 weeks. G2: same as G1 but gradually weaning participants from the dependency on the center-based program toward independent promotion and self-regulation of physical activity at home.
Borges, RC. 2014, Arch Phys Med Rehabil	TG: 15 CG: 14	TG: 8 (53) CG: 10 (71)	TG: 64 (13) CG: 68 (9)	TG: 42 (14) CG: 39 (16)	Accelerometer: DynaPort Minimod, Minimod, McRoberts, The Hague, The Netherlands	_ _	TG: Resistance training programme for the upper and lower limbs 1x/day for at least 3 days during hospital admission for acute exacerbation. CG: Usual care.

Breyer, MK. 2010, Respir Research	TG: 30 CG: 30	TG: 14 (47) CG: 13 (43)	TG: 62 (9) CG: 59 (8)	TG: 48 (19) CG: 47 (16)	Accelerometer: DynaPort Activity Monitor; McRoberts BV, The Hague, The Netherlands	_ _	TG: three-month outdoor Nordic Walking exercise program consisting of one hour walking at 75% of their initial maximum heart rate three times per week. CG: No exercise intervention.
Casaburi, R. 2012, COPD	G1: 11 G2: 11	G1: 8 (73) G2: 6 (55)	G1: 67 (10) G2: 67 (8)	G1: 30 (8) G2: 37 (13)	Accelerometer: RT3, Stayhealthy, Monrovia, CA	_ _	G1: Oxygen therapy with 22-lb E-cylinder use at home. G2: Oxygen therapy with 3.6-lb aluminum use at home.
Coronado, M. 2003, J Cardiopulm Rehab	15	13 (87)	67 (9)	54 (16)	Accelerometer: ADXL05; Analog Devices, Norwood, Mass, USA	_ _	Rehabilitation programme including training and education sessions over 3 weeks. Exercise training consisting of two 45-minute sessions per day, 6 or 7 days per week.
Dal Negro, R. 2010, Monaldi Arch Chest Dis	EG: 16 EC: 16	EG: 14 (88) CG: 11 (69)	EG: 75 (7) CG: 75 (7)	_ _	Accelerometer: SenseWear Armband PRO3; BodyMedia, Pittsburgh, PA, USA	_ _	EG: Nutritional intervention with essential amino acids 4g twice a day over 3 months. CG: Indistinguishable placebo 4g twice a day over 3 months.
Dal Negro, R. 2012, Monaldi Arch Chest Dis	EG: 44 PG: 44	_ _	_ _	_ _	Accelerometer: SenseWear Armband PRO3; BodyMedia, Pittsburgh, PA, USA	_ _	EG: Nutritional intervention with essential amino acids 4g twice a day over 3 months. CG: Indistinguishable placebo 4g twice a day over 3 months.

Dallas, MI. 2009, Chron Respir Dis	45	21 (47)	69 (8)	45 (18)	Pedometer: NL-200 Activity Monitor; New Life-styles, Inc; Lee's Summit, MO, USA	_ _	Pulmonary rehabilitation program 2-3 times/week over 6-12 weeks.
Daly, C. 2011, Physio Ireland	8	4 (50)	62 (6)	35 to 70	Accelerometer: RT3; Stayhealthy, Monrovia, CA, USA	_ _	Neuromuscular electrical stimulation on quadriceps and hamstring muscles 5d/week over 8 weeks.
de Blok, BM. 2006, Patient Educ Couns	EG: 10 CG: 11	EG: 5 (50) CG: 4 (36)	EG: 66 (10) CG: 63 (12)	EG: 52 (22) CG: 43 (13)	Pedometer: Yamax Digiwalker SW-200, Tokyo, Japan	_ _	EG: Rehabilitation programme over 9 weeks plus lifestyle physical activity counseling programme with feedback of a pedometer. CG: Rehabilitation programme over 9 weeks.
Duiverman, ML. 2008, Thorax	TG: 31 CG: 35	TG: 18 (58) CG: 17 (49)	TG: 63 (10) CG: 61 (7)	_ _	Pedometer Yamax Digi-Walker SW-200; Tokyo, Japan	_ _	TG: One hour 3x/week pulmonary rehabilitation programme plus the use of a bilevel positive airway pressure as nocturnal noninvasive ventilation. CG: One hour 3x/week pulmonary rehabilitation programme,
Duiverman, ML. 2011, Respir Res	TG: 24 CG: 32	TG: 16 (67) CG: 17 (53)	TG: 63 (10) CG: 61 (8)	_ _	_ _	Groningen Activity and Restriction Scale, Zigmond (1983).	TG: Home based physiotherapy 1-2 times/week over 2 years plus the use of a bilevel positive airway pressure as nocturnal noninvasive ventilation. CG: Home based physiotherapy 1-2 times/week over 2 years

Effing, T. 2011, Respir Med	EG: 77 EC: 76	EG: 45 (58) CG: 44 (58)	EG: 63 (8) CG: 64 (8)	EG: 50 (14) CG: 51 (17)	Pedometer Yamax Digi-Walker SW-200; Tokyo, Japan	_ _	EG: Four weekly 2-h self-management sessions plus the COPE-active programme: a 6-month 3 sessions/week exercise training followed by a 5-month 2 sessions/week period (optional). CG: Four weekly 2-h self-management sessions.
Egan, C. 2012, Respir Med	47	_ _	_ _	47 (17)	Accelerometer: SenseWear Armband PRO3; BodyMedia; Pittsburgh, PA, USA	_ _	EG: Pulmonary rehabilitation was held 2x/week for seven weeks with a recommended three further days of 30 min of moderate intensity of activity.
Engstrom, CP. 1999, Scand J Rehabil Med	TG: 26 CG: 24	TG: 14 (54) CG: 12 (50)	TG: 66 (5) CG: 67 (5)	TG: 31 (11) CG: 34 (10)	_ _	Sickness Impact Profile, Bergner (1981)	TG: Daily walking plus a physiotherapy programme 2x/week for 6 weeks, 1x/week for another 6 weeks period, once every second week for 6 weeks and then once a month for 30 weeks. CG: Usual outpatient care.
Faager, G. 2004, J Rehab Med	EG: 10 CG: 10	EG: 3 (30) CG: 3 (30)	EG: 72 (9) CG: 70 (8)	EG: 26 (7) CG: 28 (6)	_ _	Stanford Health Assessment Questionnaire (HAQ) (Ekdahl, 1988)	EG: Supervised exercise training once a week plus home-based exercise at least 3x/week over 8 weeks. CG: Routine instructions only.

Faulkner, J. 2010, Prim Care Respir J	EG: 6 CG: 8	_ _	_ _	EG: 65 (12) CG: 67 (12)	_ _	Seven day physical activity recall questionnaire (7 day PA) (Blair, 1984)	EG: 1x/week 90-minute supervised exercise and educational sessions plus self-monitored activity levels at home throughout the course of the 8-week intervention. CG: Usual care.
Goris, AHC. 2003, British J Nutrition	EG: 11 CG: 9	EG: 6 (55) CH: 5 (56)	EG: 61 (12) CG: 62 (10)	EG: 40 (13) CG: 41 (19)	Accelerometer: Tracmor; Philips Research, Eindhoven, Netherlands	_ _	EG: Nutritional supplementation with Respifor (sip-feed, Nutricia, The Netherlands) 3x125 ml daily plus nutritional advice. CG: Nutritional advice.
Hataji, O. 2013, COPD	23	21 (91)	70 (2)	65 (4)	Accelerometer: Lifecorder; Suzuken Corporation, Nagoya, Japan	_ _	Four weeks receiving 150 µg/day of inhaled indacaterol.
Hospes, G. 2009, Patient Educ Couns	TG: 18 CG: 17	TG: 10 (56) CG: 11 (65)	TG: 63 (8) CG: 61 (9)	TG: 67 (18) CG: 62 (14)	Pedometer Yamax Digi-Walker SW-200; Tokyo, Japan	_ _	TG: 12-week exercise counseling program designed to enhance daily physical activity with a pedometer. CG: Usual care.
Kesten, S. 2008, Int J COPD	EG: 25 CG: 21	EG: 14 (56) CG: 11 (52)	EG: 68 (7) CG: 67 (7)	EG: 32 (12) CG: 36 (12)	_ _	Non validated activity questionnaire.	EG: Tiotropium 18 µg once daily for 5 weeks prior to, 8 weeks during, and 12 weeks following a 3x/week pulmonary rehabilitation programme. CG: Placebo once daily for 5 weeks prior to, 8 weeks during, and 12 weeks following a 3x/week pulmonary rehabilitation programme.

Kozu, R. 2011, Respiration	45	38 (84)	67 (5)	45 (12)	_ _	Activities of daily living score, Spector (1987)	8-week twice a week pulmonary rehabilitation programme followed by 6-month home-based programme.
Larson, JL. 2014, Int J COPD	G1: 15 G2: 20 G3: 14	_ _	G1: 71 (8) G2: 72 (9) G3: 71 (8)	G1: 61 (20) G2: 54 (17) G3: 56 (17)	Actigraph (model 7164)	_ _	G1: self-efficacy enhancing intervention with upper body resistance training 3x/week over 4 months. G2: health education with upper body resistance training 3x/week over 4 months. G3: health education with gentle chair exercises 3x/week over 4 months.
Mendoza, L. 2015, Eur Respir J	TG: 52 CG: 50	TG: 29 (56) CG: 33 (66)	TG: 68.9 (9.5) CG: 68.4 (7.5)	TG: 66.1 (18.2) CG: 66.0 (20.8)	Tanita PD724 pedometer	_ _	TG: 3 month PA advice with feedback of a pedometer. CG: PA advice.
Mercken, EM. 2005, Am J Respir Crit Care Med	11	6 (54)	57 (2)	39 (4)	Accelerometer: Physical Activity Monitor (Pam). Pam (type AM 100; Pam B.V., The Netherlands)	_ _	Inpatient pulmonary rehabilitation programme 2x/day, 5d/week over 8 weeks.
Mohammadi, F. 2013, Br J Community Nurs	_ _	_ _	_ _	_ _	_ _	Barthel Index, Katz (2003).	EG: Home-based rehabilitation programme consisted of three one-hour sessions of face-to-face, individual training plus exercise programme for 7 weeks after hospital discharge. CG: Routine care consisted of drug therapy.

Moy, ML. 2010, J Rehabil Res Dev	24	13 (54)	56 (7)	_ _	Pedometer Omron HJ-720ITC; OMRON Healthcare, Inc; Bannockburn, Illinois	_ _	4 months Internet-mediated walking program with the feedback of a pedometer.
Moy, ML. 2012, Respir Med	27	27 (100)	72 (8)	55 (16)	Pedometer Omron HJ-720ITC; OMRON Healthcare, Inc; Bannockburn, Illinois	_ _	Physical activity enhancing programme using a pedometer and an internet walking program over a three-month period.
Nguyen, HQ. 2009, COPD	EG: 9 CG: 8	EG: 3 (33) CG: 3 (37)	EG: 72 (9) CG: 64 (12)	EG: 47 (19) CG: 34 (15)	Accelerometer: Stepwatch® 3 Activity Monitor; OrthoCare Innovations, Washington DC, USA	_ _	EG: individualized exercise plan with a pedometer and exercise booklet plus self-monitoring with weekly reinforcement text messages on their cell phones. CG: individualized exercise plan with a pedometer and exercise booklet plus self-monitoring with a mobile phone.
Nield, M. 2005, J Cardiopulm Rehab	48	14 (29)	66 (8)	35 (15)	_ _	Human Activity Profile (HAP) (Fix & Daughton, 1988)	Rehabilitation programme 3 hours 3 times per week for 6 weeks.

Nield, MA. 2007, J Cardiopulm Rehabil & Prev	G1: 14 G2: 13 CG: 13	G1: 13 (93) G2: 13 (100) CG: 12 (92)	G1: 62 (12) G2: 63 (5) CG: 69 (8)	G1: 35 (8) G2: 43 (16) CG: 40 (15)	_ _	Human Activity Profile (HAP) (Fix & Daughton, 1988)	G1: Daily pursed-lips breathing training over 4 weeks. G2: Daily expiratory muscle training with a Threshold PEP (HealthScan, New Jersey) over 4 weeks. CG: Health education pamphlet about lungs and lung disease.
Ninot, G. 2007, Disabil Rehabil	23	_ _	64 (7)	56 (13)	_ _	Physical Self Inventory-6 (PSI6)	Inpatient pulmonary rehabilitation programme, 5d/week over four weeks.
Nishijima, Y. 2015, Int J COPD	18	17 (94)	74.2 (6.5)	55.2 (17.9)	Lifecorder® Ex 4-second version (Suzuken Corporation, Nagoya, Japan)	_ _	Inhaled indacaterol 150 µg/day once daily during 12 weeks.
Pitta, F. 2008, Chest	29	_ _	67 (8)	46 (16)	Accelerometer: DynaPort Activity Monitor; McRoberts BV, The Hague, The Netherlands	_ _	Pulmonary rehabilitation programme 3x/week over 12 weeks plus the same programme 2x/week over 12 weeks.
Pleguezuelos, E. 2013, Respir Med	G1: 34 G2: 37 CG: 54	G1: 34 (100) G2: 37 (100) CG: 54 (100)	G1: 70 (3) G2: 71 (3) CG: 72 (2)	G1: 32 (1) G2: 32 (1) CG: 32 (1)	_ _	Diary card.	G1: Walking programme in urban walking circuits following a 3-months 3x/week pulmonary rehabilitation programme. G2: Walking programme without urban walking circuits following a 3-months 3x/week pulmonary rehabilitation programme. CG: Usual care.

Pomidori, L. 2012, J Cardiopulm Rehab Prev	G1: 18 G2: 18	G1: 13 (72) G2: 14 (78)	G1: 70 (9) G2: 74 (7)	G1: 48 (13) G2: 49 (12)	Accelerometer: SenseWear Armband PRO3; BodyMedia, Pittsburgh, PA, USA	– –	G1: Home-based walking exercise training 20 to 30 minutes/day for at least 4 days/week over one year using a metronome to maintain the prescribed walking speed. G2: Home-based walking exercise training 20 to 30 minutes/day for at least 4 days/week over one year using a fixed distance.
Probst, VS. 2011, Respir Care	G1: 20 G2: 20	G1: 11 (55) G2: 10 (50)	G1: 65 (10) G2: 67 (7)	G1: 39 (14) G2: 40 (13)	Accelerometer: DynaPort Activity Monitor; McRoberts BV, The Hague, The Netherlands; and SenseWear Armband PRO3; BodyMedia, Pittsburgh, PA, USA	– –	G1: 1-hour training sessions of calisthenics and breathing exercise, 3x/week, for 12 weeks. G2: 1-hour training sessions of endurance and strength training, 3x/week, for 12 weeks.
Ries, AL. 1995, Annals of Internal Medicine	G1: 57 G2: 62	G1: 42 (74) G2: 45 (73)	G1: 62 (8) G2: 64 (6)	– –	– –	Adapted form of the self efficacy questionnaire, Kaplan (1984).	G1: Pulmonary rehabilitation programme consisted of twelve 4-hour sessions over 8 weeks plus monthly follow-up visits for 1 year. G2: Educational control programme consisted of four 2-hour sessions biweekly over 8 weeks.

Sandland, CJ. 2008, Chest	EG: 10 CG: 10	EG: 6 (60) CG: 8 (80)	EG: 71 (4) CG: 76 (8)	EG: 43 (16) CG: 44 (29)	Accelerometer: Gaehwiler Z80 – 32k V1 Int; Gaehwiler Electronics, Hombrechtikon, Switzerland	– –	EG: Oxygen therapy using a flow rate of 2 L/min via a nasal cannula over 8 weeks (no limit on cylinder usage). CG: Compressed air using a flow rate of 2 L/min via a nasal cannula over 8 weeks (no limit on cylinder usage).
Sewell, L. 2005, Chest	G1: 90 G2: 90	G1: 60 (67) G2: 51 (57)	G1: 69 (9) G2: 67 (8)	– –	Accelerometer: Gaehwiler Z80 – 32k V1 Int; Gaehwiler Electronics, Hombrechtikon, Switzerland	Canadian Occupational Performance Measure (COPM) (Law, 1998)	G1: Pulmonary rehabilitation 2x/week (1-hour aerobic training and 1-hour general strengthening exercises weekly) over 7 weeks. G2: Pulmonary rehabilitation 2x/week (1-hour aerobic training and 1-hour exercises based on daily activities weekly) over 7 weeks.
Sewell, L. 2010, J Cardiopulm Rehab Prev	95	56 (59)	66 (9)	– –	Accelerometer: Gaehwiler Z80 – 32k V1 Int; Gaehwiler Electronics, Hombrechtikon, Switzerland	– –	Pulmonary rehabilitation 2x/week (1-hour aerobic training and 1-hour circuit training exercises weekly) over 7 weeks during the four seasons of the year.
Shioya, T. 2008, Arzneimittelforschung	EG: 9 CG: 8	– –	EG: 75 (8) CG: 74 (4)	EG: 48 (12) CG: 49 (13)	– –	London Chest Activities of Daily Living Scale (LCADL), Garrod (2000).	EG: Inhaled procaterol 3x/day at a dose of 20 µg over 52 weeks. CG: Inhaled oxitropium 3x/day at a dose of 200 µg over 52 weeks.

Skumlien, S. 2008, Respir Med	G1: 20 G2: 20	G1: 11 (55) G2: 11 (55)	G1: 62 (7) G2: 63 (9)	G1: 48 (17) G2: 50 (13)	– –	Hyrim Physical Activity Questionnaire (HPAQ) (Anderssen, 2000); and Glittre ADL-test (Skumlien, 2005)	G1: 2x/week Resistance training over 12 weeks (following 4 weeks of inpatient pulmonary rehabilitation). G2: 2x/week Endurance training over 12 weeks (following 4 weeks of inpatient pulmonary rehabilitation).
Steele, BG. 2003, J Cardiopulm Rehabil	38	37 (97)	64 (8)	39 (17)	Accelerometer: Tritrac R3D (Research Ergometer, Professional Products, Madison, Wis)	– –	Pulmonary rehabilitation programme twice a week plus home-based exercise at least 3x/week over 8 weeks.
Steele, BG. 2008, Arch Phys Med Rehab	TG: 50 CG: 52	– –	– –	– –	Accelerometer: RT3, Stayhealthy, Monrovia, CA	Walking Self-Efficacy Questionnaire, Kaplan (1994).	TG: Home- and community-based exercise programme with emphasis on walking and adherence intervention (pedometer use and weekly phone calls) over 3 months following a PR programme twice a week for 8 weeks. CG: Usual care following a PR programme twice a week for 8 weeks.
Tabak, M. 2013, Clinical Rehabilitation	EG: 14 CG: 16	EG: 8 (57) CG: 11 (69)	EG: 65 (9) CG: 68 (6)	EG: 49 (17) CG: 56 (11)	Pedometer Yamax Digi-Walker SW-200; Tokyo, Japan	– –	EG: Telerehabilitation intervention consisted by activity coaching with a 3D accelerometer and a smartphone and a web portal with an overview of the measured activity levels over 4 weeks. CG: Usual care.

Takigawa, N. 2007, Respir Med	stage II: 21 stage III: 79 stage IV: 125	stage II: 15 (71) stage III: 68 (86) stage IV: 118 (94)	stage II: 72 (63-81) stage III: 69 (54-84) stage IV: 67 (45-79)	stage II: 60 (7) stage III: 38 (6) stage IV: 23 (5)	_ _	Non-validated scale	Pulmonary Rehabilitation was performed using a 4- to 8-week, 5x/week in a hospital-based programme.
Troosters, T. 2014, NPJ Prim Care Respir Med	TG: 238 PG: 219	TG: 166 (70) PG: 147 (67)	TG: 61 (8) PG: 62 (9)	TG: 66 (8) PG: 66 (8)	Accelerometer: SenseWear Armband PRO3; BodyMedia, Pittsburgh, PA, USA.	_ _	TG: Tiotropium bromide 18 µg once daily via HandiHaler, self administered in the morning for 24 weeks. PG: Placebo once daily via HandiHaler, self administered in the morning for 24 weeks.
Varga, J. 2007, Respir Med	G1: 22 G2: 17 G3: 32	G1: 19 (86) G2: 11 (65) G3: 25 (78)	G1: 61 (12) G2: 67 (10) G3: 60 (12)	G1: 51 (16) G2: 64 (29) G3: 52 (16)	_ _	Non-validated scale	G1: High intensity, continuous training 3 times/week over 8 weeks. G2: Interval training 3 times/week over 8 weeks. G3: Home-based, self-paced training roughly 3 times/week over 8 weeks.
Vergeret, J. 1989, Eur Respir J	G1: 75 G2: 51 G3: 33	G1: 63 (84) G2: 45 (88) G3: 31 (94)	G1: 63 (7) G2: 61 (8) G3: 62 (9)	_ _	_ _	Non-validated questionnaire	G1: Oxygen concentrator only. G2: Oxygen concentrators plus gaseous oxygen in 0.4 m3 cylinders. G3: Oxygen concentrators plus liquid oxygen in the form of a stroller and liberator.

Walker, PP. 2008, Thorax	23	12 (52)	66 (9)	36 (12)	Accelerometer: Actiwatch; Cambridge Neurotechnology, Cambridge, UK; and Dynaport Activity Monitor; McRoberts BV, Den Haag, Netherlands	Nottingham Extended Activities of Daily Living (EADL) scale (Lincoln, 1992)	8-week outpatient pulmonary rehabilitation programme consisted of two supervised and one unsupervised 1-hour exercise session per week.
Watz, H. 2014, BMC Pulmonary Medicine	83	– –	– –	– –	Accelerometer: SenseWear® Armband®; BodyMedia, Pittsburgh, PA, USA	– –	TG: 150 ug 4x/day of Indacaterol. CG: placebo to indacaterol via single-dose dry powder inhaler.
Weekes, CE. 2009, Thorax	EG: 31 CG: 28	EG: 16 (52) CG: 14 (50)	EG: 69 (48-89) CG: 69 (46-85)	EG: 31 (13) CG: 33 (15)	– –	Townsend score (Bond, 1982)	EG: Leaflet providing advice on nourishing snacks/drinks and encouraging food fortification plus dietary counselling and a supply of milk powder for use in food fortification over 6 months. CG: Leaflet providing advice on nourishing snacks/drinks and encouraging food fortification.

Wewel, A. 2008, Respir Med	21	17 (81)	65 (9)	32 (9)	Pedometer: Kasper & Richter GmbH & Co. KG; Uttenreuth, Germany; and accelerometer: ActiTrac-Monitor; Somnomedics, Kist, Germany	_ _	Home-based activity enhancing programme involving the use of a pedometer and phone calls every other day over two weeks.
Yohannes, AM. 2003, Clinical Rehabilitation	G1: 26 G2: 28 G3: 28 G4: 28	G1: 15 (58) G2: 13 (46) G3: 19 (68) G4: 12 (43)	G1: 75 (7) G2: 75 (7) G3: 74 (7) G4: 74 (8)	G1: 38 (15) G2: 38 (11) G3: 39 (10) G4: 35 (11)	_ _	The Barthel ADL index, Collin (1988).	All groups received 3-sessions/day of mobilization training over hospitalization period with: G1: Gutter frame with supplemental air. G2: Gutter frame with supplemental oxygen. G3: Rollator with supplemental air. G4: Rollator with supplemental oxygen.

G1, G2, G3 and so on: group 1, group 2, group 3 and so on; TG: training group; CG: control group; EG: experimental group; PG: placebo group; NA: not available.

Online supplement table S2. **Reasons for excluding studies from the final analysis after full text assessment.**

Reference	Reason for exclusion
Chen, G. 2011, Zhong Nan Da Xue Xue Bao Yi Xue Ban	Non-English article
Deng, X. 2001, Zhonghua Jie He He Hu Xi Za Zhi	Non-English article
Fanfulla, F. 1997, Medicina Clinica e Termale	Non-English article
Lisboa, C. 1995, Rev Med Chil	Non-English article
Muzembo Ndundu, J. 2001, Rev Pneumol Clin	Non-English article
Rico-Mendez, FG. 2005, Arch Bronconeumol	Non-English article
Ruhle, KH. 2008, Pneumologie	Non-English article
Zhang, ZQ. 2008, Chinese Critical Care Medicine	Non-English article
Beauchamp, MK. 2014	No full text article available
Carlin, BW. 2009, Respiratory Care	No full text article available
Gold, P. M. 2009, Respiratory Care	No full text article available
Gurgun, A. 2013, Chest	No full text article available
Harris, N. 2009, International Journal of Rehabilitation Research	No full text article available
Hartman, JE. 2012, European Respiratory Journal	No full text article available
Lareau, SC. 2003	No full text article available
Leemans, G. 2012, Thorax	No full text article available
Leemans, G. 2013, European Journal of General Practice	No full text article available
Leidy, N. K. 2007, COPD	No full text article available

Lewis, K. E. 2011, AMJRCCM	No full text article available
Lorenz, J. 2011, Pneumologie	No full text article available
Roche, N. 2007, European Respiratory Review	No full text article available
Steele, B. 2001	No full text article available
Troosters, T. 2011, AMJRCCM	No full text article available
Vogelmeier, CF. 2011, Proceedings of the American Thoracic Society	No full text article available
ZuWallack, R. L. 2008, Respiratory Care	No full text article available
Watts, S. 2013, Respirology	No full text article available
Aguilaniu, B. 2010, International Journal of COPD	Reviews / Non-original articles
Ashworth, NL. 2005, Cochrane database of systematic reviews	Reviews / Non-original articles
Bahadori, K. 2007, International Journal of COPD	Reviews / Non-original articles
Bourbeau, J. 2010, Seminars in Respiratory and Critical Care Medicine	Reviews / Non-original articles
Casaburi, R. 2011, Proc Am Thorac Soc	Reviews / Non-original articles
Chavannes, N. 2002, British Journal of General Practice	Reviews / Non-original articles
Cindy Ng, LW. 2012, Chronic Respiratory Disease	Reviews / Non-original articles
Clini, EM. 2005, Chronic Respiratory Disease	Reviews / Non-original articles
Costi, S. 2009, Physical Therapy	Reviews / Non-original articles
Coultas, D. 2009, Clinical Pulmonary Medicine	Reviews / Non-original articles
Decramer, M. 2008, Respiratory Medicine	Reviews / Non-original articles
Garrod, R. 2008, Cochrane Database of	Reviews / Non-original articles

Systematic Reviews	
Gimeno-Santos, E. 2014, Thorax	Reviews / Non-original articles
Hanania, NA. 2007, Clinical Therapeutics	Reviews / Non-original articles
Herring, MP. 2012, Archives of Internal Medicine	Reviews / Non-original articles
Kuijpers, W. 2013, Journal of medical Internet research	Reviews / Non-original articles
Langer, D. 2009, Clinical Rehabilitation	Reviews / Non-original articles
Leidy, NK. 2014, Respiratory Medicine	Reviews / Non-original articles
Mallampalli, A. 2004, Nutrition in Clinical Practice	Reviews / Non-original articles
Maltais, F. 2013, Physician and Sports medicine	Reviews / Non-original articles
Menadue, C. 2009, Cochrane Database of Systematic Reviews	Reviews / Non-original articles
Miravitlles, M. 2010, Prevention of exacerbations of copd with pharmacotherapy	Reviews / Non-original articles
O'Donnell, DE. 2003, Canadian Respiratory Journal	Reviews / Non-original articles
O'Donnell, DE. 2008, Canadian Respiratory Journal	Reviews / Non-original articles
O'Donnell, DE. 2006, COPD	Reviews / Non-original articles
Ohar, J. 2006, Journal of Respiratory Diseases	Reviews / Non-original articles
O'Shea, SD. 2004, Chest	Reviews / Non-original articles
O'Shea, SD. 2009, Chest	Reviews / Non-original articles
Puhan, M. A. 2007, International Journal of Respiratory Care	Reviews / Non-original articles
Spruit, M. A. 2013, AMJRCCM	Reviews / Non-original articles

Troosters, T. 2013, Respiratory Research	Reviews / Non-original articles
Vaes, AW. 2013, Annals of Medicine	Reviews / Non-original articles
Welte, T. 2009, International Journal of Clinical Practice	Reviews / Non-original articles
Benzo, RP. 2013, Chronic Respiratory Disease	No quantitative results
Norweg, A. 2008, Occupational Therapy International	No quantitative results
O'Shea, SD. 2007, Chronic Respiratory Disease	No quantitative results
Baarends, EM. 1997, AMJRCCM	No physical activity outcome
Behnke, M. 2000, Respiratory Medicine	No physical activity outcome
Bentsen, SB. 2010, Patient Education and Counselling	No physical activity outcome
Camillo, CA. 2011, Respiratory Medicine	No physical activity outcome
Costi, S. 2009, Chest	No physical activity outcome
Donesky-Cuenco, D. 2009, J Altern Complement Med	No physical activity outcome
Dyer, CA. 2013, Physiotherapy	No physical activity outcome
Furness, T. 2014, BMC Pulmonary Medicine	No physical activity outcome
Hecht, A. 2009, Journal of Chronic Obstructive Pulmonary Disease	No physical activity outcome
Heppner, PS. 2006, Journal of Cardiopulmonary Rehabilitation	No physical activity outcome
Katsura, H. 2003, Journal of the American Geriatrics Society	No physical activity outcome
Marrara, KT. 2008, Respiratory Medicine	No physical activity outcome
Nakamura, Y. 2008, Int J Rehabil Res	No physical activity outcome
Panton, LB. 2004, Eur J Appl Physiol	No physical activity outcome

Partridge, MR. 2009, Ther Adv Respir Dis	No physical activity outcome
Petty, TL. 2006, Journal of Cardiopulmonary Rehabilitation	No physical activity outcome
Rutten-Van Molken, MPMH. 1995, AMJRCCM	No physical activity outcome
Simpson, K. 1992, Thorax	No physical activity outcome
Soicher, J. E. 2012, European Respiratory Journal	No physical activity outcome
Utens, CMA. 2013, International Journal of Nursing Studies	No physical activity outcome
Velloso, M. 2013, COPD	No physical activity outcome
Wardini, R. 2013, Canadian Respiratory Journal	No physical activity outcome
Zwerink, M. 2013, Respiratory Medicine	No physical activity outcome
Ashmore, J. 2013, Contemporary Clinical Trials	No results presented
Chang, AT. 2008, Contemporary Clinical Trials	No results presented
Charususin, N. 2013, BMJ Open	No results presented
Cleutjens, FAHM. 2014, BMJ Open	No results presented
Foy, CG. 2006, Contemporary Clinical Trials	No results presented
Holland, AE. 2013, BMC Pulmonary Medicine	No results presented
Maltais, F. 2005, Canadian Respiratory Journal	No results presented
Martinez, CH. 2014, BMC Pulmonary Medicine	No results presented
Katz, PP. 2010, Journal of Cardiopulmonary Rehabilitation and Prevention	No intervention performed

Nguyen, HQ. 2006, COPD	No intervention performed
Okubadejo, AA. 1997, European Respiratory Journal	No intervention performed
Omata, M. 2007, Allergol Int	No intervention performed
Sliwinski, P. 1994, European Respiratory Journal	No intervention performed
Ayabe M. 2010, Journal of Cardiopulmonary Rehabilitation & Prevention	Other reasons: non COPD study
Brovold, T. 2013, Journal of the American Geriatrics Society	Other reasons: non COPD study
Chen, YH. 2012, Respiratory Care	Other reasons: few patients with COPD
Kallings LV. 2008, Scandinavian Journal of Medicine & Science in Sports	Other reasons: non COPD study
Leveille SG. 1998, Journal of the American Geriatrics Society	Other reasons: non COPD study
Lorenzi, CM. 2004, Respiration	Other reasons: few patients with COPD
Schonhofer, B. 1997, European Respiratory Journal	Other reasons
Schou, L. 2013, J Telemed Telecare	Other reasons
Verwey, R. 2014, J Telemed Telecare	Other reasons

Online supplement table S3. Sample size, presence of randomisation and blinding in the included studies.

Reference	Sample size	Randomised process?	Blind assessment/randomisation?
Altenburg, WA. 2015, Respir Med	155	YES	No blind assessment or randomisation.
Barberan-Garcia, A. 2013, Respir Med	117	NO	No blind assessment or randomisation.
Bauldoff, GS. 2002, Chest	24	YES	No blind assessment or randomisation.
Behnke, M. 2005, Respir Med	88	NO	No blind assessment or randomisation.
Bendstrup, KE. 1997, Eur Respir J	32	YES	No blind assessment or randomisation.
Berry, M. 2010, Respir Med	176	YES	Blind assessment. Blind randomisation.
Borges, RC. 2014, Arch Phys Med Rehabil	29	YES	Blind assessment. Blind randomisation.
Breyer, MK. 2010, Respir Research	60	YES	No blind assessment or randomisation.
Casaburi, R. 2012, COPD	22	YES	No blind assessment or randomisation.
Coronado, M. 2003, J Cardiopulm Rehab	15	NO	No blind assessment or randomisation.
Dal Negro, R. 2010, Monaldi Arch Chest Dis	32	YES	Blind assessment. Blind randomisation.
Dal Negro, R. 2012,	88	YES	Blind assessment. Blind randomisation.

Monaldi Arch Chest Dis			
Dallas, MI. 2009, Chron Respir Dis	45	NO	No blind assessment or randomisation.
Daly, C. 2011, Physio Ireland	8	NO	No blind assessment or randomisation.
de Blok, BM. 2006, Patient Educ Couns	21	YES	Blind for randomisation. Not blind for assessment.
Duiverman, ML. 2008, Thorax	66	YES	No blind assessment or randomisation.
Duiverman, ML. 2011, Respir Res	56	YES	No blind assessment or randomisation.
Effing, T. 2011, Respir Med	153	YES	No blind assessment or randomisation.
Egan, C. 2012, Respir Med	47	NO	No blind assessment or randomisation.
Engstrom, CP. 1999, Scand J Rehabil Med	50	YES	Blind assessment. No blind randomisation.
Faager, G. 2004, J Rehab Med	20	YES	No blind assessment or randomisation.
Faulkner, J. 2010, Prim Care Respir J	14	YES	No blind assessment or randomisation.
Goris, AHC. 2003, British J Nutrition	20	YES	No blind assessment or randomisation.
Hataji, O. 2013, COPD	23	NO	No blind assessment or randomisation.
Hospes, G. 2009, Patient Educ Couns	35	YES	No blind assessment or randomisation.

Kesten, S. 2008, Int J COPD	46	YES	Blind assessment. Blind randomisation.
Kozu, R. 2011, Respiration	45	NO	No blind assessment or randomisation.
Larson, JL. 2014, Int J COPD	49	YES	Blind assessment. Blind randomisation.
Mendoza, L. 2015, Eur Respir J	102	YES	Blind assessment. Blind randomisation.
Mercken, EM. 2005, Am J Respir Crit Care Med	11	NO	No blind assessment or randomisation.
Mohammadi, F. 2013, Br J Community Nurs	Non Available	YES	No blind assessment or randomisation.
Moy, ML. 2010, J Rehabil Res Dev	24	NO	No blind assessment or randomisation.
Moy, ML. 2012, Respir Med	27	NO	No blind assessment or randomisation.
Nguyen, HQ. 2009, COPD	17	YES	. Blind for assessment. Not blind for randomisation
Nield, M. 2005, J Cardiopulm Rehab	48	NO	No blind assessment or randomisation.
Nield, MA. 2007, J Cardiopulm Rehabil & Prev	40	YES	No blind assessment or randomisation.
Ninot, G. 2007, Disabil Rehabil	23	NO	No blind assessment or randomisation.
Nishijima, Y. 2015, Int J COPD	18	NO	No blind assessment or randomisation.
Pitta, F. 2008,	29	NO	No blind assessment or randomisation.

Chest			
Pleguezuelos, E. 2013, Respir Med	125	YES	No blind assessment or randomisation.
Pomidori, L. 2012, J Cardiopulm Rehab Prev	36	YES	No blind assessment or randomisation.
Probst, VS. 2011, Respir Care	40	YES	No blind assessment or randomisation.
Ries, AL. 1995, Annals of Internal Medicine	119	YES	Not blind for assessment. Blind for randomisation.
Sandland, CJ. 2008, Chest	20	YES	Blind assessment. Blind randomisation.
Sewell, L. 2005, Chest	180	YES	Not blind for assessment. Blind for randomisation.
Sewell, L. 2010, J Cardiopulm Rehab Prev	95	YES	Not blind for assessment. Blind for randomisation.
Shioya, T. 2008, Arzneimittelforschung	17	YES	No blind assessment or randomisation.
Skumlien, S. 2008, Respir Med	40	NO	No blind assessment or randomisation.
Steele, BG. 2003, J Cardiopulm Rehabil	38	NO	No blind assessment or randomisation.
Steele, BG. 2008, Arch Phys Med Rehab	102	YES	No blind assessment or randomisation.
Tabak, M. 2013, Clinical Rehabilitation	30	YES	Not blind for assessment. Blind for randomisation.

Takigawa, N. 2007, Respir Med	225	NO	No blind assessment or randomisation.
Troosters, T. 2014, NPJ Prim Care Respir Med	457	YES	Blind assessment. Blind randomisation.
Varga, J. 2007, Respir Med	71	NO	No blind assessment or randomisation.
Vergeret, J. 1989, Eur Respir J	159	YES	No blind assessment or randomisation.
Walker, PP. 2008, Thorax	23	NO	No blind assessment or randomisation.
Watz, H. 2014, BMC Pulmonary Medicine	83	YES	Blind assessment. Blind randomisation.
Weekes, CE. 2009, Thorax	59	YES	No blind assessment or randomisation.
Wewel, A. 2008, Respir Med	21	NO	No blind assessment or randomisation.
Yohannes, AM. 2003, Clinical Rehabilitation	110	YES	Blind assessment. Blind randomisation.

References

1. Gimeno-Santos E, Frei A, Steurer-Stey C, et al. Determinants and outcomes of physical activity in patients with COPD: a systematic review. *Thorax.* 2014;69(8):731-739.
2. Crowther M AA, MacLennan G, Mowatt G. A further use for the Harvest plot: a novel method for the presentation of data synthesis. *Res Syn Meth.* 2011;2:79-83.
3. Ogilvie D, Fayter D, Petticrew M, et al. The harvest plot: a method for synthesising evidence about the differential effects of interventions. *BMC medical research methodology.* 2008;8:8.