Online supplement

Breathing techniques to reduce symptoms in people with serious respiratory illness: a systematic review

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Systematic review protocol: Should breathing techniques be used to reduce symptoms in people with serious illness related to lung disease?

Provided to European Respiratory Review editorial office in April 2023, to be held in confidence.

P	Adults with serious illness related to lung disease
I	Breathing exercises
C	No breathing exercises or sham/placebo intervention
O	Critical: Breathlessness Important: health-related quality of life, adverse events

Types of studies: We will include randomised controlled trials. We will exclude crossover trials, as the intervention includes behavioural components where carryover of intervention effects to the second period may occur. We will only include crossover studies if pre-crossover data are available

Where a high-quality, relevant systematic review has been published (e.g. Cochrane Collaboration), this will be utilised in order to increase the efficiency of the guideline development process. The AMSTAR-2 checklist (Shea et al, BMJ 2017) will be used to appraise the quality of these existing reviews.

Types of participants: We will include adults with serious illness related to lung disease. Serious illness is defined as a condition that carries a high risk of mortality, negatively impacts quality of life and daily function, and/or is burdensome in symptoms, treatments, or caregiver stress (Kelley AS. J Palliat Med. 2014;17:985.)

For mixed studies (eg studies including those with malignant disease) we will ask the authors for data related to the participants with non-malignant disease only. If separate data are unable to be obtained then we will include studies only if ≥80% of participants have non-malignant disease.

Types of interventions: We will include any type of breathing exercises, either supervised or unsupervised. Breathing exercises will be defined as any technique that aims to alter the respiratory pattern. This could be achieved with or without external devices, and either during exercise or at rest. Examples include pursed lip breathing, deep breathing, ventilation-feedback training and yoga breathing. As responses to different types of breathing exercises may vary, these interventions will be assessed separately.

Trials where breathing exercises are combined with another training intervention (e.g. relaxation) will be included provided 50% or more of the training consisted of breathing exercises. Trials of respiratory muscle training will not be included, as these interventions aim to improve respiratory muscle strength, rather than alter the respiratory pattern.

Types of comparisons:

- breathing exercises versus no intervention
- breathing exercises versus sham/placebo intervention
- breathing exercises in addition to a standard intervention common to both groups

Outcomes:

Critical:

- Breathlessness, using relevant and validated tool. This may include measures at rest or during exercise, but exercise measures obtained before and after an intervention must be obtained at iso-workload.

Important:

- Health related quality of life, using any validated tool
- Adverse events, defined according to the investigators' definition.

Reporting one of more of the outcomes listed here in the trial is not an inclusion criterion for the review.

Search methods: We will identify trials from searches of the following databases:

• Cochrane Central Register of Controlled Trials (CENTRAL) (Cochrane Library) (latest issue);

• MEDLINE (Ovid) (1950 to date); and

• EMBASE (Ovid) (1974 to date).

We will first search for any relevant previous systematic reviews. Included studies in earlier reviews will be assessed for eligibility for inclusion in this review. Database searches will be undertaken (from time of publication of most recent review to date) to identify subsequently published studies for screening.

Searching other resources: We will check reference lists of all primary studies and review articles for additional references. We will search for errata or retractions from included studies published in full-text on PubMed and report the date this was done within the review.

Assessment of risk of bias: Two authors will independently assess risk of bias for each study using the Cochrane Collaboration's Risk of Bias (1) tool.

Measures of treatment effect: We will analyse dichotomous data as odds ratios (ORs). For continuous data, we will use mean differences (MDs) or standardised mean differences (SMDs). Where it is reported, we will use the change from baseline. Where the change from baseline is not reported, we will use the adjusted results or final score. We will enter data presented as a scale with a consistent direction of effect (e.g. health-related quality of life data). We will undertake meta-analyses only where this is meaningful, i.e. if the treatments, participants and the underlying clinical question are similar enough for pooling to make sense. We will narratively describe skewed data reported as medians and interquartile ranges. Where multiple trial arms are reported in a single trial, we will include only the relevant arms. If two comparisons are combined in the same meta-analysis, we will halve the control group to avoid double-counting.

Dealing with missing data: We will contact trial investigators or study sponsors in order to verify key study characteristics and obtain missing numerical outcome data where possible (e.g. when a study is identified as abstract only). Where this is not possible, and the missing data are thought to introduce serious bias, we will explore the impact of including such studies in the overall assessment of results by a sensitivity analysis.

Assessment of heterogeneity: We will use the I^2 statistic to measure heterogeneity among the trials in each analysis. If we identify substantial heterogeneity, we will report it and explore possible causes by prespecified subgroup analysis.

Assessment of reporting biases: If we are able to pool more than 10 trials, we will create and examine a funnel plot to explore possible small study and publication biases.

Data synthesis: We will perform a pooled quantitative synthesis where the trials are clinically homogeneous. We will pool data using a random-effects model to incorporate between study heterogeneity into the meta-analysis. Where the trials are clinically heterogeneous, we will perform a narrative synthesis.

Subgroup analysis: No subgroup analyses will be performed, as there are unlikely to be sufficient data to draw meaningful conclusions.

Sensitivity analysis: We will perform sensitivity analyses to examine the effects of methodological quality on the pooled estimate by removing studies that are at high or unclear risk of bias for the domains of blinding and incomplete outcome data.

Search Strategies

Database(s): Ovid MEDLINE(R) and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations, Daily and Versions

#	Searches
1	lung diseases/ or "cystic adenomatoid malformation of lung, congenital"/ or cystic fibrosis/ or hepatopulmonary syndrome/ or lung abscess/ or lung diseases, interstitial/ or alveolitis, extrinsic allergic/ or bird fancier's lung/ or farmer's lung/ or silo filler's disease/ or trichosporonosis/ or anti-glomerular basement membrane disease/ or histiocytosis, langerhans-cell/ or eosinophilic granuloma/ or pneumoconiosis/ or anthracosis/ or anthracosilicosis/ or asbestosis/ or berylliosis/ or byssinosis/ or caplan syndrome/ or siderosis/ or silicosis/ or silicotuberculosis/ or pulmonary fibrosis/ or idiopathic pulmonary fibrosis/ or hamman-rich syndrome/ or idiopathic interstitial pneumonias/ or cryptogenic organizing pneumonia/ or sarcoidosis, pulmonary/ or hypertension, pulmonary/ or familial primary pulmonary hypertension/ or pulmonary arterial hypertension/ or Pulmonary Heart Disease/ or lung diseases, obstructive/ or asthma/ or asthma-chronic obstructive pulmonary disease overlap syndrome/ or bronchiolitis obliterans/ or cryptogenic organizing pneumonia/ or bronchitis, chronic/ or pulmonary disease, chronic obstructive/ or pulmonary emphysema/ or plasma cell granuloma, pulmonary/ or bronchial diseases/ or bronchiectasis/ or respiratory tract diseases/ or respiration disorders/ or dyspnea/
2	(lung disease* or pulmonary disease* or cystic fibrosis or interstitial pneumoni* or extrinsic allergic alveolit* or hypersensitivity pneumoniti* or pneumoconios?s or anthracos?s or anthracosilicos?s or asbestos?s or beryllios?s or byssinos?s or beryllium disease* or caplan syndrome or bird fancier* lung or farmer* lung or silo filler* disease or trichosporonos?s or sideros?s or silicos?s or silicotuberculos?s or fibrosing alveolit* or pulmonary fibros?s or fibrocystic pulmonary dysplasia* or hamman-rich disease or hamman-rich syndrome or cryptogenic organizing pneumonia* or pulmonary sarcoidos?s or bronchiolitis obliterans or constrictive bronchiolit* or exudative bronchiolit* or chronic bronchitis or emphysema* or pulmonary inflammatory pseudotumo?r or pulmonary plasma cell granuloma* or bronchial disease* or bronchiectas?s).mp.
3	(((chronic or severe* or unrelenting or obstructive) adj asthma*) or (chronic* obstruct* adj3 (lung* or airway* or pulmon* or bronch* or alveolit* or respiratory))).mp.
4	(bronchopulmonary disease* or lung granulomatos?s or pneumopath* or pulmonary disorder* or acute pneumonitis or chronic fibrous pneumonia* or fibroid phthisis or interstitial cell pneumonia or interstitial plasma cell pneumonia or interstitial pneumocystic pneumonia or phthisis fibroidea or pneumonia interstitialis or interstitial fibros?s or lung fibros?s or interstitial fibros?s or alveolar fibros?s or respiratory granulomatos?s or pulmonary granulomatos?s or lung granulomatos?s or lung conios?s or pneumoconiotic lesion or pneumokonios?s or pneumono?onios?s or (airway obstructive disease* or obstructive airway disorder* or obstructive respiratory disease* or obstructive respiratory disorder* or pneumatosis pulmonum or interstitial syndrome)).mp.
5	(((lung or pulmonary) adj (arter* hypertens* or hypertens* or fixed hypertens* or capillary hemangiomatosis or veno-occlusive or venoocclusive or parenchyma* disease*)) or (corpulmonale or cor pulmonale or pulmonary cardiac disease* or pulmonary vascular obstructive disease* or obstructive pulmonary vascular disease*)).mp.
6	1 or 2 or 3 or 4 or 5
7	breathing exercises/ or qigong/
8	(Buteyko or Pranayam* or yoga* or papworth technique or papworth method* or breathing gymnastics or qigong or "ch'i kung" or "qi gong" or breathwork or breath work or holotropic breathing).mp.
9	(breath* adj3 (exercise* or train* or educat* or retrain* or reeducat* or technique*)).mp.

10	(breath* adj3 (coaching or guidance or instruction* or teach* or taught or tutor* or lesson* or learn* or upskill* or reskill* or workshop* or work-shop* or course* or class* or seminar* or drills)).mp.
11	(respirat* adj (exercise* or training or educat* or retrain* or reeducat* or technique* or coaching or guidance or instruction* or teach* or tutor* or lesson* or reskill* or workshop* or work-shop* or drills)).mp.
12	((pursed lip* or diaphragmatic or yogic or deep or slow or relaxation or relaxed) adj (breathing or respiration)).mp.
13	(Breathing control or respiration control or breathing man?uvers or breathing man?uvres).mp.
14	(control* adj3 breath* adj5 (coaching or coached or educat* or guidance or instruction* or practi#e* or practi#ing or teach* or taught or tutor* or lesson* or learn* or upskill* or reskill* or workshop* or work-shop* or course* or class* or seminar* or drills)).mp.
15	((breath* or respiratory) adj5 (physiotherap* or physical therap* or chest physiotherap* or chest physical therap*)).mp.
16	((breath* adj2 pattern) and (computeri#ed feedback or biofeedback)).mp.
17	(Ventilat* feedback or Ventilat* biofeedback or Ventilat* feed-back or Ventilat* bio-feedback).mp.
18	((breath* adj2 pattern) and (computeri#ed feedback or biofeedback or bio feed back or feedback)).mp.
19	or/7-18
20	6 and 19
21	(dyspn?e* or "short* of breath" or "urge* to breathe*" or breathless* or suffocat* or ("need for air" or "gasp* for air" or "gasp* to breathe" or "pant* for air") or (unsatisf* inspiration or inspiratory difficult* or expiratory difficult*)).mp.
22	((labo?red or difficult*) adj3 breath*).mp.
23	(breath* adj1 (distress* or discomfort* or dysfunction*)).mp.
24	(air adj3 (hunger or starv*)).mp.
25	or/21-24
26	19 and 25
27	20 or 26
28	(randomized controlled trial or controlled clinical trial).pt. or (randomi?ed or placebo).ab. or clinical trials as topic.sh. or randomly.ab. or trial.ti.
29	((cross over or crossover) adj (clinical study or clinical trial or design or method or study or trial or studies)).mp.
30	28 or 29
31	27 and 30

Database(s): Embase

#	Searches
1	lung disease/ or chronic lung disease/ or interstitial lung disease/ or interstitial syndrome/ or lung emphysema/ or lung fibrosis/ or lung sarcoidosis/ or obstructive lung disease/ or fibrosing alveolitis/ or interstitial pneumonia/ or pneumoconiosis/ or asthma/ or chronic obstructive lung disease/ or severe asthma/ or asthmatic state/ or severe persistent asthma/ or obstructive airway disease/ or occupational lung disease/ or anthracosis/ or asbestosis/ or berylliosis/ or bird breeder lung/ or byssinosis/ or farmer lung/ or occupational asthma/ or pigeon breeder lung/ or pneumoconiosis/ or silicosis/ or bronchus disease/ or bronchiectasis/ or lung granuloma/ or respiratory tract disease/ or dyspnea/
2	(lung disease* or pulmonary disease* or cystic fibrosis or interstitial pneumoni* or extrinsic allergic alveolit* or hypersensitivity pneumoniti* or pneumoconios?s or anthracos?s or anthracosilicos?s or asbestos?s or beryllios?s or byssinos?s or beryllium disease* or caplan syndrome or bird fancier* lung or farmer* lung or silo filler* disease or trichosporonos?s or sideros?s or silicos?s or silicotuberculos?s or fibrosing alveolit* or pulmonary fibros?s or fibrocystic pulmonary dysplasia* or hamman-rich disease or hamman-rich syndrome or cryptogenic organizing pneumonia* or pulmonary sarcoidos?s or bronchiolitis obliterans or constrictive bronchiolit* or exudative bronchiolit* or chronic bronchitis or emphysema* or pulmonary inflammatory pseudotumo?r or pulmonary plasma cell granuloma* or bronchial disease* or bronchiectas?s).mp.
3	(((chronic or severe* or unrelenting or obstructive) adj asthma*) or (chronic* obstruct* adj3 (lung* or airway* or pulmon* or bronch* or alveolit* or respiratory))).mp.
4	(bronchopulmonary disease* or lung granulomatos?s or pneumopath* or pulmonary disorder* or acute pneumonitis or chronic fibrous pneumonia* or fibroid phthisis or interstitial cell pneumonia or interstitial plasma cell pneumonia or interstitial pneumocystic pneumonia or phthisis fibroidea or pneumonia interstitialis or interstitial fibros?s or lung fibros?s or interstitial fibros?s or alveolar fibros?s or respiratory granulomatos?s or pulmonary granulomatos?s or lung granulomatos?s or lung conios?s or pneumoconiotic lesion or pneumokonios?s or pneumono?onios?s or (airway obstructive disease* or obstructive airway disorder* or obstructive respiratory disease* or obstructive respiratory disorder* or pneumatosis pulmonum or interstitial syndrome)).mp.
5	(((lung or pulmonary) adj (arter* hypertens* or hypertens* or fixed hypertens* or capillary hemangiomatosis or veno-occlusive or venoocclusive or parenchyma* disease*)) or (corpulmonale or cor pulmonale or pulmonary cardiac disease* or pulmonary vascular obstructive disease* or obstructive pulmonary vascular disease*)).mp.
6	1 or 2 or 3 or 4 or 5
7	breathing exercise/ or breathwork/ or buteyko breathing/ or pranayama/ or qigong/
8	(Buteyko or Pranayam* or yoga* or papworth technique or papworth method* or breathing gymnastics or qigong or "ch'i kung" or "qi gong" or breathwork or breath work or holotropic breathing).mp.
9	(breath* adj3 (exercise* or train* or educat* or retrain* or reeducat* or technique*)).mp.
10	(breath* adj3 (coaching or guidance or instruction* or teach* or taught or tutor* or lesson* or learn* or upskill* or reskill* or workshop* or work-shop* or course* or class* or seminar* or drills)).mp.
11	(respirat* adj (exercise* or training or educat* or retrain* or reeducat* or technique* or coaching or guidance or instruction* or teach* or tutor* or lesson* or reskill* or workshop* or work-shop* or drills)).mp.
12	((pursed lip* or diaphragmatic or yogic or deep or slow or relaxation or relaxed) adj (breathing or respiration)).mp.

13	(Breathing control or respiration control or breathing man?uvers or breathing man?uvres).mp.
14	(control* adj3 breath* adj5 (coaching or coached or educat* or guidance or instruction* or practi#e* or practi#ing or teach* or taught or tutor* or lesson* or learn* or upskill* or reskill* or workshop* or work-shop* or course* or class* or seminar* or drills)).mp.
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19	or/7-18
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23	(breath* adj1 (distress* or discomfort* or dysfunction*)).mp.
24	(air adj3 (hunger or starv*)).mp.
25	or/21-24
26	19 and 25
27	20 or 26
28	randomized controlled trial/ or randomization/ or single blind procedure/ or double blind procedure/ or crossover procedure/ or placebo/ or prospective study/
29	(randomi?ed controlled or RCT or randomly allocated or allocated randomly or random allocation or "allocated at random" or single blind* or double blind* or ((treble or triple) adj blind*) or placebo*).mp.
30	((cross over or crossover) adj (clinical study or clinical trial or design or method or study or trial or studies)).mp.
31	or/28-30
32	27 and 31
33	limit 27 to (randomized controlled trial or controlled clinical trial)
34	32 or 33

Database(s): EBM Reviews - Cochrane Central Register of Controlled Trials

#	Searches
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17	(Ventilat* feedback or Ventilat* biofeedback or Ventilat* feed-back or Ventilat* bio-feedback).mp.
18	((breath* adj2 pattern) and (computeri#ed feedback or biofeedback or bio feed back or feedback)).mp.
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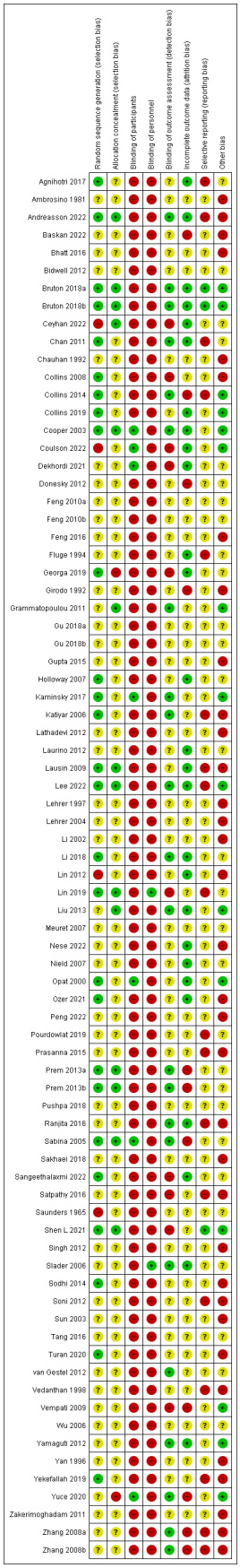
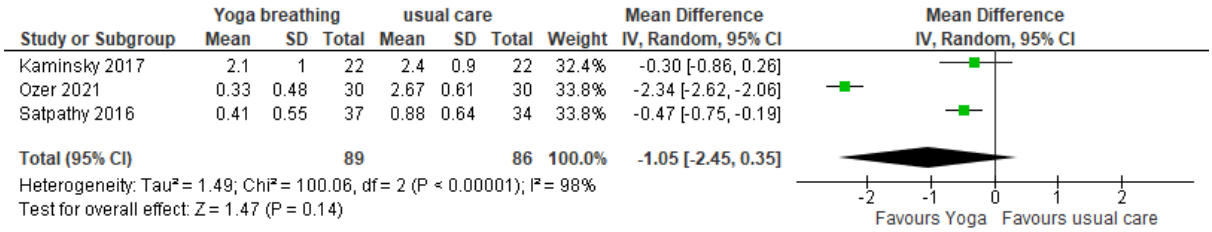
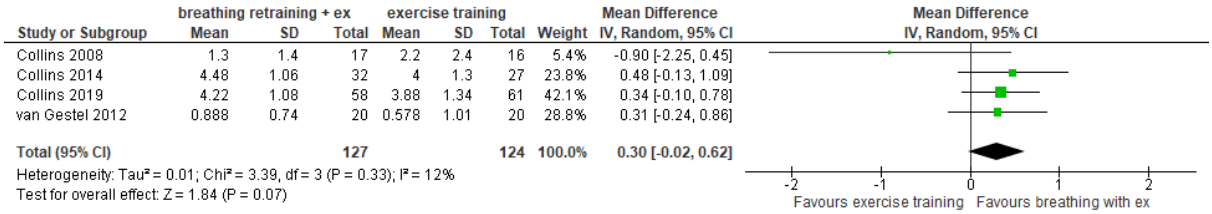
21	(dyspn?e* or "short* of breath" or "urge* to breathe*" or breathless* or suffocat* or ("need for air" or "gasp* for air" or "gasp* to breathe" or "pant* for air") or (unsatisf* inspiration or inspiratory difficult* or expiratory difficult*)).mp.
22	((labo?red or difficult*) adj3 breath*).mp.
23	(breath* adj1 (distress* or discomfort* or dysfunction*)).mp.
24	(air adj3 (hunger or starv*)).mp.
25	or/21-24
26	19 and 25
27	20 or 26



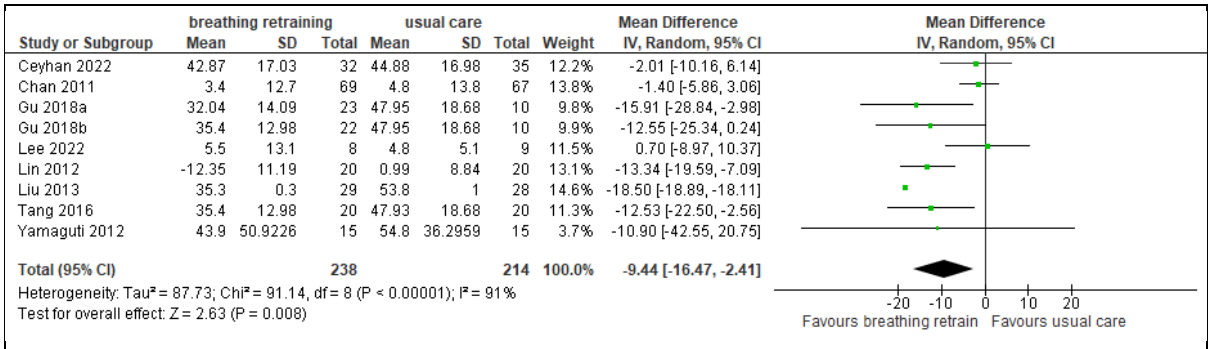
Supplementary Figure 1. Risk of bias summary: review authors' judgements about each risk of bias item for each included study.



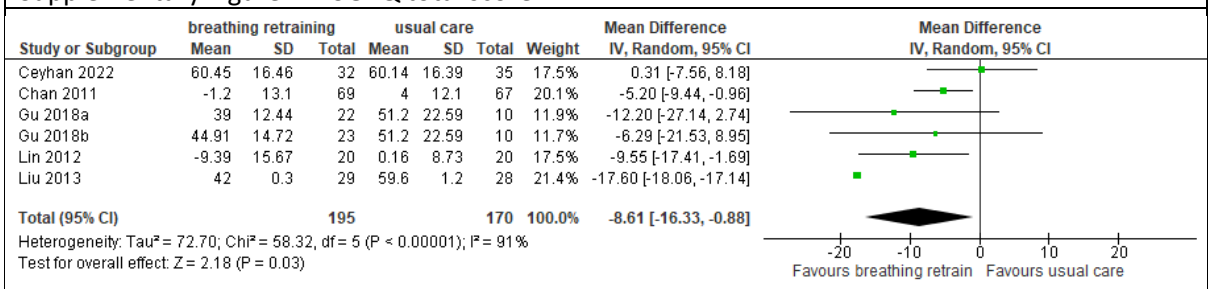
Supplementary Figure 2. Forest plot for breathlessness (modified Medical Research Council scale score) for Yoga vs. usual care.



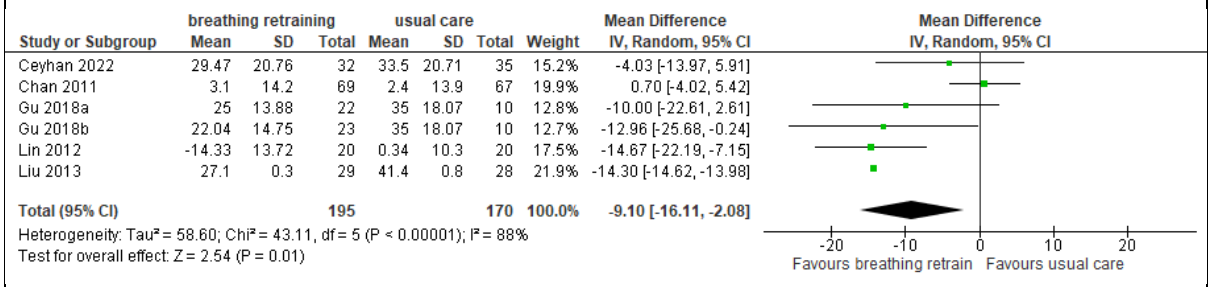
Supplementary Figure 3. Forest plot for breathlessness (CRQ dyspnoea domain score) breathing retraining added to exercise training vs exercise training



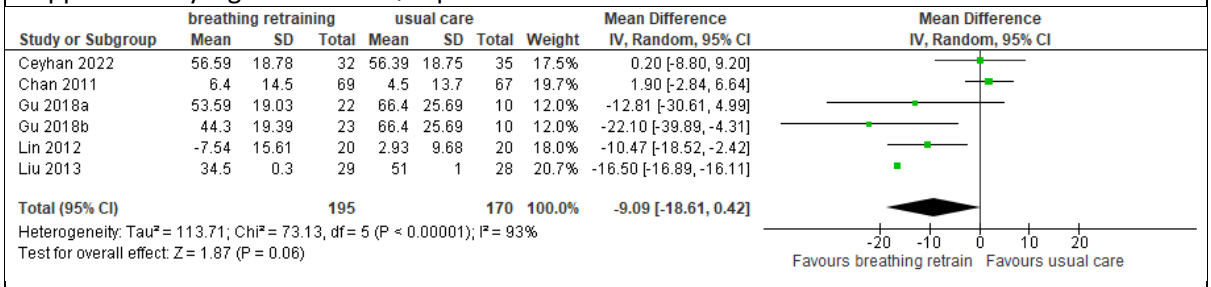
Supplementary Figure 4.1 SGRQ total score



Supplementary Figure 4.2 SGRQ symptoms domain score

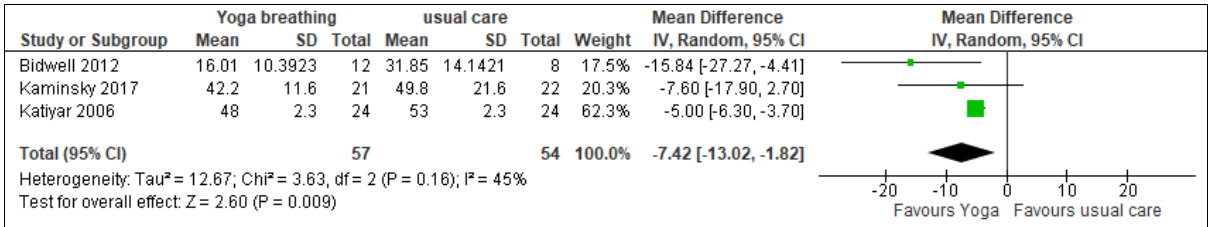


Supplementary Figure 4.3 SGRQ impact domain score

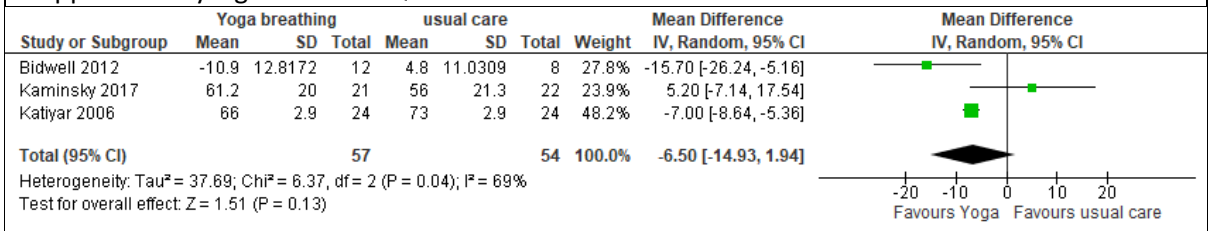


Supplementary Figure 4.4 SGRQ activities domain score

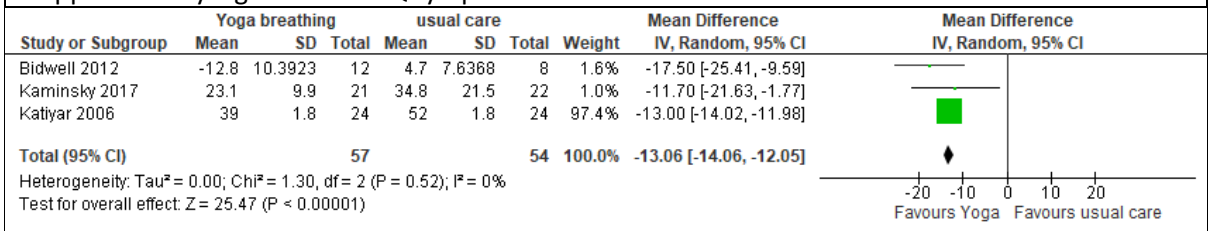
Supplementary Figure 4. Forest plots for health-related quality of life (St George's Respiratory Questionnaire [SQRQ]) for breathing exercises vs. usual care.



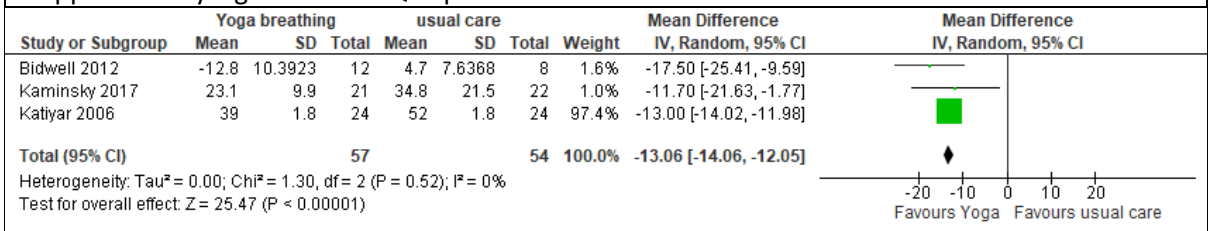
Supplementary Figure 5.1 SGRQ total score



Supplementary Figure 5.2 SGRQ symptoms domain score

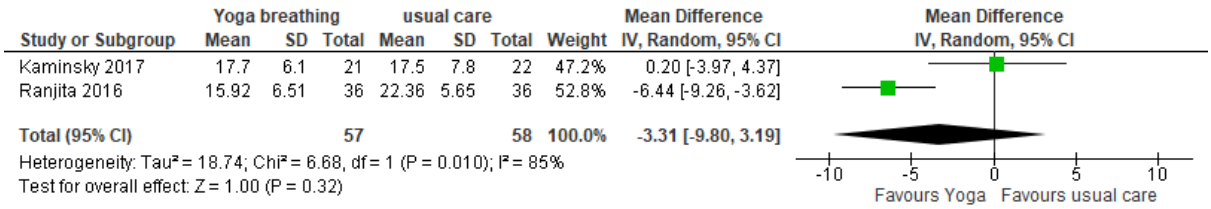


Supplementary Figure 5.3 SGRQ impact domain score

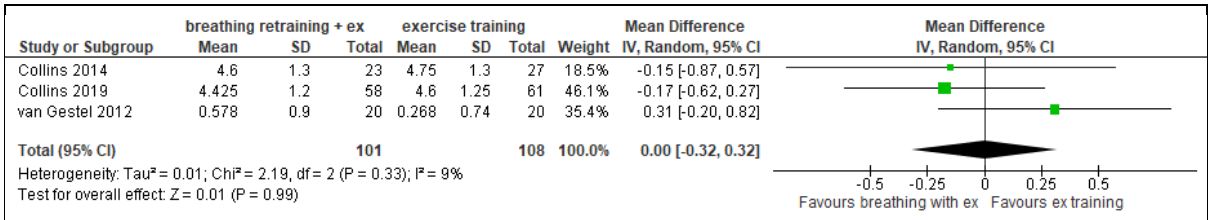


Supplementary Figure 5.4 SGRQ activities domain score

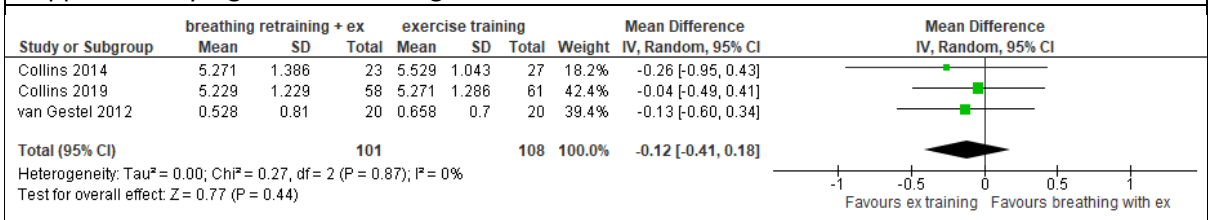
Supplementary Figure 5. Forest plots for health-related quality of life (St George's Respiratory Questionnaire [SQRQ]) for Yoga vs. usual care.



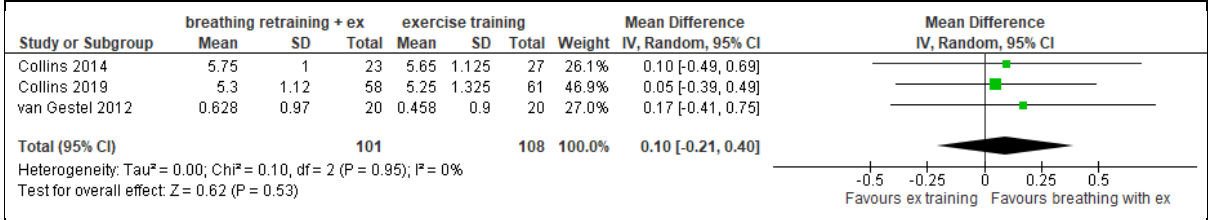
Supplementary Figure 6. Forest plot for health-related quality of life (COPD Assessment Test score) for Yoga vs. usual care.



Supplementary Figure 7.1 CRQ fatigue domain score

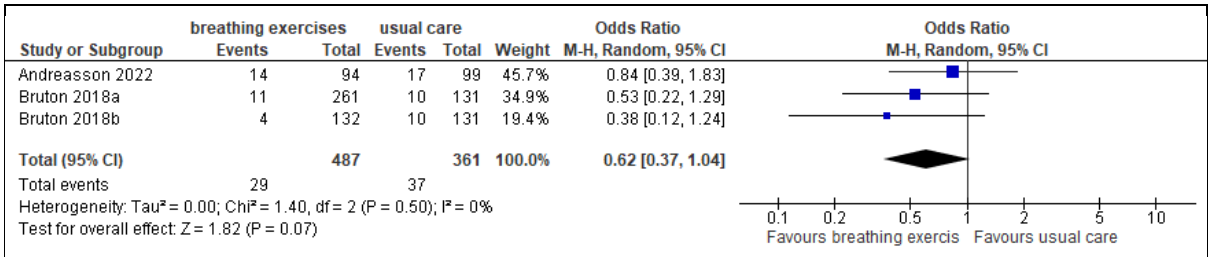


Supplementary Figure 7.2 CRQ emotional function domain score

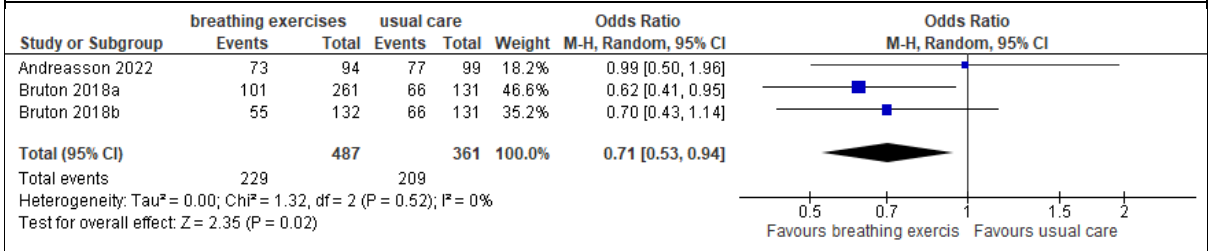


Supplementary Figure 7.3 CRQ mastery domain score

Supplementary Figure 7. Forest plots for health-related quality of life (Chronic Respiratory Disease Questionnaire [CRQ] fatigue, emotional function and mastery domain scores) for breathing retraining with biofeedback added to exercise training vs. exercise training.

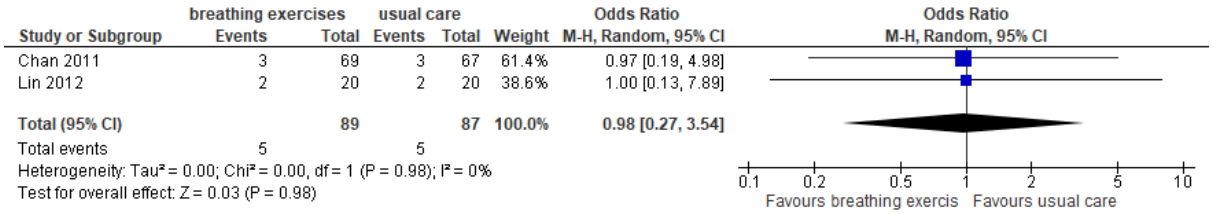


Supplementary Figure 8.1 Serious adverse events

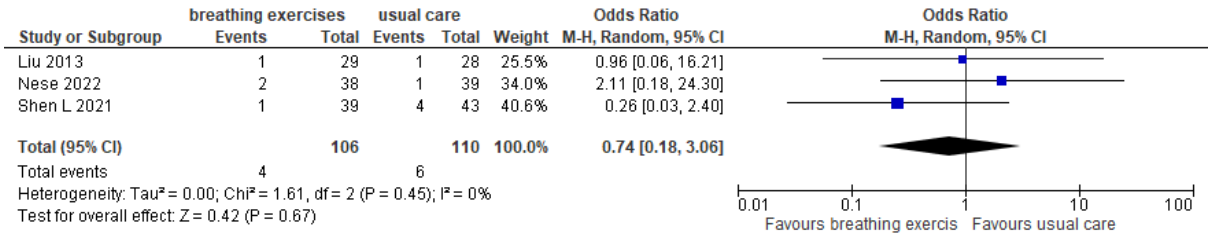


Supplementary Figure 8.2 Adverse events

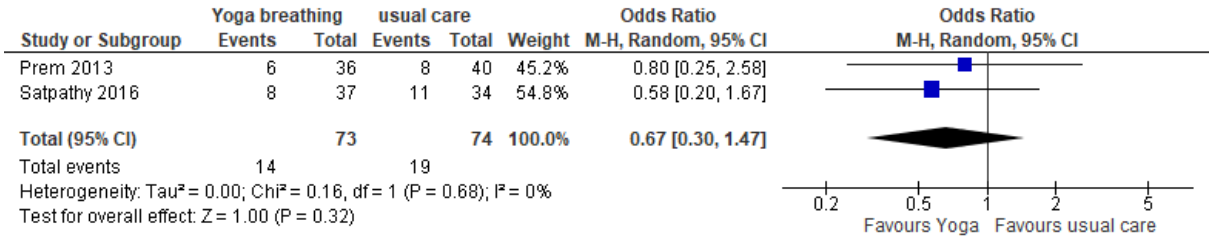
Supplementary Figure 8. Forest plots for adverse events (number of participants with serious adverse and adverse events) for breathing exercises vs. usual care.



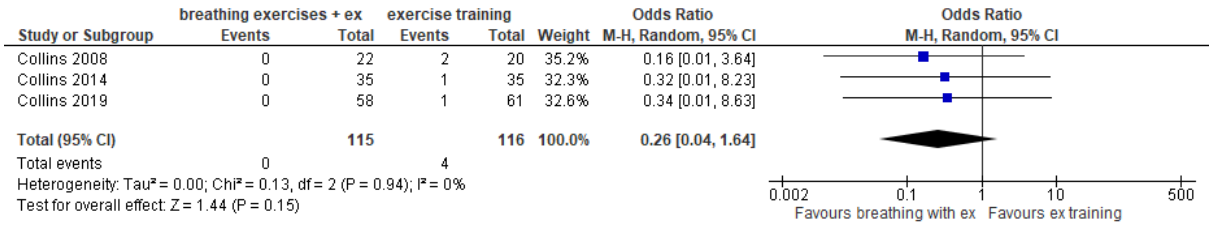
Supplementary Figure 9. Forest plot for adverse events (number of participants with hospital admission) for breathing exercises vs. usual care.



Supplementary Figure 10. Forest plot for adverse events (mortality) for breathing exercises vs. usual care.



Supplementary Figure 11. Forest plot for adverse events (number of participants with exacerbation) for Yoga vs. usual care



Supplementary Figure 12. Forest plot for adverse events (number of participants with exacerbation) for breathing exercises added to exercise training vs. exercise training alone.

Supplementary Table 1. AMSTAR-2: Quality assessment for systematic reviews

	Burgess 2011	Hindelang 2020	Holland 2012	Jayawardena 2020	Santino 2020	Xu 2022	Yang 2016	Yang 2020
1. Did the research questions and inclusion criteria for the review include the components of PICO?	No[a]	Yes	Yes	Yes	Yes	Yes	Yes	No[a]
2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?	No	No	Yes	No	Yes	No	Yes	No
3. Did the review authors explain their selection of the study designs for inclusion in the review?	Yes	No	Yes	No	No	No	No	No
4. Did the review authors use a comprehensive literature search strategy?	partial yes[b]	partial yes[d]	Yes	d	Yes	partial yes[b]	Yes	partial yes[b]
4. Did the review authors perform study selection in duplicate?	Yes	not described	Yes	Yes	Yes	Yes	Yes	not described
6. Did the review authors perform data	not described	not described	Yes	No	Yes	Yes	Yes	Yes

extraction in duplicate?								
7. Did the review authors provide a list of excluded studies and justify the exclusions?	No	No	Yes	No	Yes	No	Yes	No
8. Did the review authors describe the included studies in adequate detail?	partial yes[c]	Yes	Yes	partial yes[c]	Yes	Yes	Yes	partial yes[c]
9. Did the review authors use a satisfactory technique for assessing the RoB in individual studies that were included in the review?	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10. Did the review authors report on the sources of funding for the studies included in the review?	No	No	No	No	Yes	Yes	No	No
11. If MAs were performed did the review authors use appropriate methods for statistical combination of results?	Yes	no meta-analysis	Yes	no meta-analysis	Yes	Yes	Yes	Yes
12. If MAs were performed, did the review authors assess	No	no meta-analysis	Yes	no meta-analysis	Yes	Yes	Yes	No

the potential impact of RoB in individual studies on the results of the MAs or other evidence synthesis?								
13. Did the review authors account for RoB in individual studies when interpreting/ discussing the results of the review?	No	No	Yes	No	Yes	No	Yes	No
14. Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14. If they performed quantitative synthesis did the review authors carry out an adequate investigation of publication bias and discuss its likely impact on the results of the review?	No	no meta-analysis	Yes	no meta-analysis	Yes	No	Yes	No
16. Did the review authors report any potential sources of conflict of interest,	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

including any funding they received for conducting the review?								

[a]did not define comparator; [b]did not search registries; [c]did not describe population in detail; [d]did not justify publication restrictions (years, language)

Supplementary Table 2. Participant and study characteristics grouped by participant diagnosis

Study Country	Diagnosis Duration (+/- timing)	Participant characteristics (number, age, sex, measure of disease severity)		Study characteristics				
				Intervention characteristics		Outcomes reported		
		Intervention group (s)	Comparator group	Intervention (s)	Comparator	Critical	Important	
						Breathlessness	HRQoL	AE
Agnihotri 2017 India	Asthma 6 months	n=125 37 (11) years 54 (44%) female FEV_1 68 (6) %pred	n=130 39 (11) years 49 (41%) female FEV_1 68 (5)%pred	Yoga breathing, 5 sessions per week, 30 min per session	Usual care		AQLQ	
Ambrosino 1981 Italy	COPD 4 weeks	n=23 58 (7) years 0 (0%) female	n=28 56 (9) years 0 (0%) female	Breathing exercises (DB and PLB) twice daily	Usual care			
		FEV_1 not reported						
Andreasson 2022 Denmark	Asthma 12-week intervention, 6 and 12-month follow-up	n=94 median 55 [IQR 44 to 65] years 58 (62%) female FEV_1 median 80 [IQR 73 to 87] %pred	n=99 median 51 [IQR 42 to 61] years 64 (65%) female FEV_1 median 80 [IQR 66 to 90] %pred	Breathing exercises, 2 sessions per day, 10 min per session	Usual care		Mini-AQLQ	Number of participants with adverse events; serious adverse events; exacerbation; Mortality
Baskan 2022 Turkey	Asthma 4 weeks	n=10 mean 34 years, range 23 to 55 7 (70%) female	n=10 mean 34 years, range 23 to 55 6 (60%) female	Breathing exercises (DB and PLB), 1 session per day, 20-30 min per session	Usual care		AQLQ	
		FEV_1 not reported						
Bhatt 2016 India	Asthma 12 weeks	n=40 FEV_1 1.5 (0.7) litres	n=40 FEV_1 1.4 (0.6) litres	Yoga breathing	Usual care			

		age range 18 to 72 years; sex not reported						
Bidwell 2012 United States	Asthma 10 weeks	n=12 43 (4) years 12 (100%) female FEV_1 1.9 (0.8) litres	n=8 40(4) years 8 (100%) female FEV_1 1.8 (0.9) litres	Yoga breathing, 2 sessions per week, 60 min per session	Usual care		SGRQ	
Bruton 2018a United Kingdom	Asthma 12 months	n=261 median 56 [IQR 45 to 65] years 164 (63%) femaleFEV_1 91 (19) %pred	n=132 median 57 [IQR 47-65] years 164 (63%) female FEV_1 92 (22) %pred	Breathing exercises (DVD)	Usual care		AQLQ	Number of participants with adverse and serious adverse events; Number of participants with exacerbation
Bruton 2018b United Kingdom		n=262 median 55 [IQR 47-63] years 91 (69%) female FEV_1 89 (18) %pred		Breathing exercises (face to face)				
Ceyhan 2022 Turkey	COPD 4 weeks	n=32 40-49 years n=1; 50-59 years n=6; 60-69 years n=18; 70+years n=7 3 (9%) female	n=35 40-49 years n=2; 50-59 years n=8; 60-69 years n=17; 70+years n=8 4 (11%) female	Breathing exercises (PLB) for 10 min prior to using inhaler medication	Usual care	mMRC scale (data transformed from median to mean values)	SGRQ, COPD assessment test	Number of participants who withdrew from follow-up 'due to other illnesses'
		FEV_1 not reported						
Chan 2011* Hong Kong	COPD 12 weeks	n=69 74 (8) years 8 (12%) female FEV_1 0.9 (0.4) litres	n=37 74 (7) years 9 (13%) female FEV_1 0.9 (0.4) litres	Breathing exercises (DB and PLB during walking) 1 hour per day	Usual care		SGRQ	Number of participants with admission
	COPD	n=13	n=15		Usual care			

Chauhan 1992 United Kingdom	8 weeks	mean 65 years 7 (54%) female	mean 69 years 6 (40%) female	Breathing exercises (balloon inflation) 40 times per day		Visual analogue scale	Visual analogue scale	
		FEV_1 not reported						
Collins 2008* United States	COPD 36 sessions	n=22 68 (9) years FEV_1 41 (18) %pred	n=20 65 (7) years FEV_1 43 (15) %pred	Breathing retraining with biofeedback AND exercise training^ 3 sessions per week (interval training; 18 sessions of leg cycle exercise , 18 sessions of treadmill exercise; light upper body strength training)	Exercise training	CRQ (dyspnoea domain), Borg score at isotime	CRQ	Number of participants with exacerbation
		97% male						
Collins 2014* United States	COPD 8-week intervention, 6-week follow-up	n=35 68 (10) years FEV_1 45 (14) %pred	n=35 69 (7) years FEV_1 41 (13) %pred	Breathing retraining with biofeedback AND exercise training^ with Supplementary oxygen (3 sessions per week treadmill; 2 sessions per week upper body resistance training; Supplementary oxygen FiO_2 0.30)	Exercise training with Supplementary oxygen	CRQ (dyspnoea domain)	CRQ	Number of participants with exacerbation
		95% male						
Collins 2019 United States	COPD 12 weeks	n=58 66 (8) years FEV_1 44 (15) %pred	n=61 66 (8) years FEV_1 44 (16) %pred	Breathing retraining with biofeedback AND exercise training^ (3 sessions per week treadmill; 2 sessions per week upper body resistance training)	Exercise training	CRQ (dyspnoea domain)	CRQ	Number of participants with exacerbation
		95% male						

Cooper 2003* United Kingdom	Asthma 6 months	n=30 40 (11) years 15 (50%) female FEV_1 77 (16) %pred	n=29 47 (11) years 11 (34%) female FEV_1 82 (21) %pred	Buteyko technique, 2 sessions per day	Placebo (adapted Pink City Lung Exerciser device)		AQLQ, SF36	Number of exacerbations
Coulson 2022 United States	Asthma 4 weeks	n=45 73 (5) years 19 (42%) female FEV_1 77 (19) %pred	n=45 74 (5) years 10 (22%) female FEV_1 80 (3) %pred	Breathing exercises (DB and PLB with pranayama), 2 sessions per day, <10 min per day	Sham (incentive spirometer, one breath twice daily)		Mini-AQLQ	
Dekhordi 2021 Iran	COPD 12-week follow-up post admission	n=40 54 (7) years 14 (35%) female	n=40 53 (9) years 24 (60%) female	Breathing exercises (DB and PLB) 2-3 sessions during admission, 45 min per session	Usual care			
		FEV_1 not reported						
Donesky 2012 United States	COPD 12 weeks	n=14 72 (7) years 10 (71%) female FEV_1 51 (11) %pred	n=15 68 (12) years 11 (73%) female FEV_1 44 (19) %pred	Yoga breathing, 2 sessions per week	Usual care	CRQ (dyspnoea domain)	SF36, CRQ	Number of adverse events related to the intervention
Feng 2010a China	COPD 4 weeks following inpatient admission for exacerbation	n=30 62 (10) years 12 (40%) female FEV_1 41 (4) %pred	n=29 62 (11) years 11 (40%) female FEV_1 41 (4) %pred	Breathing exercises (DB and PLB), 60 min per day	Placebo (not described)	mMRC scale		
Feng 2010b China		n=30 62 (11) years 12 (40%) female FEV_1 41 (4) %pred		Breathing exercises (PLB), 60 min per day				
Feng 2016 China	COPD 8 weeks	n=32 56 (4) years	n=32 57 (4) years	Breathing exercises (DB and PLB), twice daily	Usual care	mMRC scale		

		8 (25%) female FEV_1 38 (6) %pred	7 (22%) female FEV_1 39 (6) %pred					
Fluge 1994* Germany	Asthma 3 weeks	n=12	n=12	Yoga breathing, 15 sessions	Usual care			
		49 (2) years; 22 (61%) female; FEV_1 not reported						
Georga 2019 Greece	Asthma 8 weeks	n=23 49 (13) years 16 (70%) female	n=19 49 (13) years 14 (74%) female	Breathing retraining with biofeedback, 2 sessions per day	Usual care		Mini-AQLQ	
		FEV_1 not reported						
Girodo 1992* Canada	Asthma 16 weeks	n=46 29 (11) years 20 (43%) female	n=23 33 (7) years 13 (57%) female	Breathing exercises (DB), 3 sessions per week, 60 min per session	Usual care			
		FEV_1 not reported						
Grammatopoulou 2011 Greece	Asthma 6 months	n=20 48 (15) years 7 (35%) female FEV_1 84 (8) %pred	n=20 45 (13) years 10 (50%) female FEV_1 84 (10) %pred	Breathing exercises (DB); Month 1: 3 sessions per week, 60 min per session; Months 2-6: 2-3 times per day, ≥20 min per session	Usual care	mMRC scale	SF36	
Gu 2018a China	COPD 8 weeks	n=22 65 (6) years 1 (0.05%) female FEV_1 36 (13) %pred	n=20 68 (8) years 1 (0.05%) female FEV_1 37 (12) %pred	Breathing exercises (breathing manoeuvre#) 3 sessions per day, 15 min per session	Usual care	mMRC scale	SGRQ	
Gu 2018b China		n=23 67 (7) years 0 (0%) female FEV_1 38 (13) %pred		Breathing exercises (DB), 3 sessions per day, 15 min per session				
Gupta 2015 India	Asthma 12 weeks	n=50	n=50	Yoga breathing	Usual care			
		Age, sex, FEV_1 not reported						

Holloway 2007 United Kingdom	Asthma 6-month intervention, 6-month follow-up	n=39 50 (14) years 21 (54%) female FEV_1 87 (19) %pred	n=46 49 (14) years 28 (61%) female FEV_1 92 (18) %pred	Papworth method, 5 sessions per week, 60 min per session	Usual care		SGRQ	Number of adverse events
Kaminsky 2017 United States	COPD 12 weeks	n=21 68 (7) years 14 (67%) female FEV_1 43 (16) %pred	n=22 68 (9) years 12 (55%) female FEV_1 42 (13) %pred	Yoga breathing, 30 min per day	Usual care	mMRC scale	CAT, SGRQ	Number of adverse events related to the intervention
Katiyar 2006 India	COPD 12 weeks	n=24 53 (3) years 5 (21%) female FEV_1 48 (2) %pred	n=24 51 years 2 (1%) female FEV_1 48 (2) %pred	Yoga breathing, 6 sessions per week, 30 min per session	Usual care		SGRQ	
Lathadevi 2012 India	Asthma 6 weeks	n=24 FEV_1 2.1 (0.5) litres	n=24 FEV_1 2.2 (0.4) litres	Yoga breathing	Usual care			
		age range 18 to 60 years; 0 (0%) female						
Laurino 2012 Brazil	Asthma 12 weeks	n=20 45 (12) years 17 (85%) female FEV_1 69 (22) %pred	n=18 42 (12) years 15 (83%) female FEV_1 67 (22) %pred	Breathing retraining with pompage ("manoeuvres performed for muscle fascia"), 1 session per week, 30 min per session	Sham ("subtle touch technique")		AQLQ	Number of participants with exacerbation
Lausin 2009 France	COPD Single session	n=21; mean 68 years; 8 (40%) female; FEV_1 not reported		Breathing exercises (DB and PLB), 15 min	Same position, nil instruction			
Lee 2022 South Korea	COPD 8 weeks	n=8 66 (10) years 1 (13%) female	n=9 71 (6) years 1 (11%) female FEV_1 1.6 (0.4) litres	Breathing exercises (DB and PLB), 5 sessions per week, 20 min per session	Usual care	mMRC scale	SGRQ, COPD assessment test	Number of participants with adverse events

		FEV_1 1.5 (0.5) litres						
Lehrer 1997 United States	Asthma 6 weeks	n=6 FEV_1 81 (21) %pred	n=6 FEV_1 68 (28) %pred	Breathing retraining with biofeedback, 6 sessions per week, 30 min per session	Sham (relaxation)			
		38 (13) years; 7 (58%) female						
Lehrer 2004* United States	Asthma 10 weeks	n=23 39 (12) years 17 (74%) female	n=25 39 (15) years 8 (70%) female	Breathing retraining with biofeedback, 1 weekly session, home practice 20 min twice daily	Usual care			Number of participants required oral corticosteroids
		FEV_1 77 (23) %predicted						
Li 2002 China	COPD 12 weeks	n=39 FEV_1 1.6 (0.6) litres	n=35 FEV_1 1.6 (0.7) litres	Breathing exercises (DB and PLB) with nutritional supplement, 2 sessions per day, 10-15 min per session	Usual care			
		Age, sex not reported						
Li 2018 China	COPD 6 months	n=17 66 (9) years 3 (18%) female FEV_1 56 (17) %pred	n=19 66 (9) years 5 (26%) female FEV_1 58 (19) %pred	Breathing exercises (Health Qigong Liuzijue), 3 to 4 sessions per week, 60 min per session	Usual care		SGRQ	
Lin 2012 Taiwan	COPD 12 weeks	n=20 68 (12) years 5 (25%) female FEV_1 42 (15) %pred	n=20 69 (9) years 2 (10%) female FEV_1 52 (19) %pred	Breathing exercises (DB and PLB), 2 sessions per day	Usual care		SGRQ	Number of participants with admission
Lin 2019 Taiwan	COPD 8-week intervention, 4-week follow-up	n=38 71 (8) years	n=40 74 (8) years	Breathing exercises, 5 sessions per week, 30 min per session	Usual care	mMRC scale	COPD assessment test	Number of participants who discontinued intervention due to illness
		4 (5%) female; FEV_1 not reported						

Liu 2013 China	COPD 4 months	n=29 69 (3) years 8 (28%) female FEV_1 0.9 (0.1) litres	n=28 69 (1) years 5 (18%) female FEV_1 0.9 (0.1) litres	Breathing exercises (DB and PLB, online program)	Usual care		SGRQ	Number of participants with exacerbation; Mortality
Meuret 2007 United States	Asthma 4 weeks	n=8 44 (11) years 6 (75%) female FEV_1 2.3 (0.5) litres	n=4 34 (16) years 3 (75%) female FEV_1 2.2 (0.7) litres	Breathing retraining with biofeedback (audio pacing), 5 sessions per week, 60 min per session	Usual care			
Nese 2022* Turkey	COPD 10 weeks	n=40 65 (8) years 9 (11%) female FEV_1 not reported	n=40 67 (7) years	Breathing exercises (DB), 3 sessions per day, 10 min per session	Usual care	Dyspnea-12 Scale		Mortality
Nield 2007* United States	COPD 4 weeks	n=14 62 (12) years 1 (7%) female FEV_1 35 (8) %pred	n=13 69 (8) years 1 (8%) female FEV_1 40 (15) %pred	Breathing exercises (PLB), 1 session per day, 10-25 min per session	Usual care	University of California, San Diego Shortness of Breath Questionnaire	SF36	
Opat 2000 Australia	Asthma 4 weeks	n=18 32 (10) years 9 (50%) female severity mild n=7; moderate n=8; severe n=1	n=18 33 (11) years 12 (67%) female severity mild n=11; moderate n=5; severe n=1	Buteyko technique (video), 2 sessions per day, 20 min per session	Placebo (nature video)		AQLQ	Number of participants with exacerbation
Ozer 2021 Turkey	Mixed COPD/asthma 8 weeks	n=30 18-25 years n=3; 26-35 years n=5; 36-45 years n=11; 46-55 years n=11	n=30 18-25 years n=0; 26-35 years n=6; 36-45 years n=15; 46-55 years n=19	Yoga breathing (Zoom), 2 sessions per week, 60-90 min per session	Usual care	mMRC scale		

		20 (67%) female FEV_1 75 (13) %pred asthma n=12 (40%) COPD n=18 (60%)	26 (87%) female FEV_1 73 (9) %pred asthma n=15 (50%) COPD n=15 (50%)					
Peng 2022 China	COPD 4-week intervention, 8-week follow-up	n=50 59 (5) years 22 (44%) female	n=50 59 (5) years 20 (40%) female	Breathing exercises (DB), 2 sessions per day, 15 min per session AND inhalation therapy (tiotropium bromide powder 18 µg once daily, N-acetylcysteine 600 mg twice daily)	Inhalation therapy			Number of 'adverse reactions'
		FEV_1 not reported						
Pourdowlat 2019 Iran	Asthma 6 weeks	n=30 20-30 years n=6; 30-40 years n=6; 40-45 years n=3 9 (60%) female	n=30 20-30 years n=6; 30-40 years n=6; 40-45 years n=3 11 (73%) female	Papworth method training 1 session per week, 120 min per session	Usual care		SF36	
		FEV_1 not reported						
Prasanna 2015 India	Asthma 8 weeks	40 (9) years 64% female	37 (8) years 60% female	Buteyko technique, 2 sessions per day	Usual care			
		n=100; FEV_1 not reported						
Prem 2013a India	Asthma 12 weeks	n=39 38 (13) years 23 (59%) female FEV_1 2.3 (0.8) litres	n=40 41 (14) years 26 (65%) female FEV_1 2.0 (0.6) litres	Buteyko technique, 2 sessions per day, 15 min per session	Usual care		AQLQ	Number of exacerbations
Prem 2013b India		n=36 35 (13) years 19 (53%) female FEV_1 2.3 (0.8) litres		Yoga breathing, 2 sessions per day, 15 min per session				

Pushpa 2018 India	Asthma 8 weeks	n=30 33 (9) years 20 (67%) female FEV_1 2.1 (0.6) litres	n=30 33 (9) years 20 (67%) female FEV_1 2.1 (0.6) litres	Yoga breathing, 2 sessions per day, 45 min per session	Usual care			
Ranjita 2016 India	COPD 12 weeks	n=36 54 (6) years 0 (0%) female	n=36 54 (5) years 0 (0%) female	Yoga breathing, 6 sessions per week, 90 min per session	Usual care	mMRC scale	COPD assessment test	Number of participants with 'illness'
		FEV_1 not reported						
Sabina 2005 United States	Asthma 16 weeks	n=29 52.3 [SE 2.59] years 24 (83%) female FEV_1 2.1 [SE 0.1] litres	n=33 49.9 [SE 2.48] years 22 (67%) female FEV_1 2.7 [SE 0.2] litres	Yoga breathing, 4 weeks of 2 sessions per week, 90 min per session; then 12 weeks of 3 sessions per week, 20 min per session	Sham (stretching)		Mini-AQLQ	Adverse events related to the intervention
Sakhaei 2018 Iran	COPD Single session	n=20 61 (13) years 11 (55%) female	n=20 62 (13) years 5 (25%) female	Breathing exercises (DB and PLB)	Usual care			
		FEV_1 not reported						
Sangeethalaxmi 2022 India	Asthma 90 days	n=30 24 (3) years FEV_1 0.9 (0.2) litres	n=30 23 (3) years FEV_1 0.9 (0.2) litres	Yoga breathing, 1 session per day	Usual care		AQLQ	
		sex not reported						
Satpathy 2016 India	Asthma 4 months	n=37 25 (2) years	n=34 25 (3) years	Yoga breathing, 1 session per day	Usual care	mMRC scale		Number of participants with exacerbation
		0 (0%) female; FEV_1 not reported						
Saunders 1965 United Kingdom	COPD 12 weeks	n=100; Age, sex not reported		Breathing exercises	Usual care			Number of participants with chest cold ("increased
		FEV_1 1.3 (0.7) litres	FEV_1 1.2 (0.6) litres					

								cough and phlegm for three weeks or more")
Shen 2021 China	ILD 12 months	n=39 65 (6) years 2 (5%) female DLCO 67 (20) %	n=43 65 (8) years 3 (7%) female DLCO 59 (22) %	Breathing exercises ("deep breathing in 3 movements"), 9 min per day	Usual care		SGRQ	Number of participants with exacerbation; Mortality
Singh 2012 India	Asthma 8 weeks	n=15 FEV_1 2.8 (0.6) litres	n=15 FEV_1 2.8 (0.7) litres	Yoga breathing, 1 session per day, 40-50 min per session	Usual care		AQLQ	
		age, sex not reported						
Slader 2006 Australia	Asthma 28 weeks	n=28 17 (61%) female FEV_1 mean 81 (95%CI 75 to 87) %pred	n=29 15 (52%) female FEV_1 mean 79 (95%CI 72 to 85) %pred	Breathing exercises, 2 sessions per day, 26 min per session	Sham (non-specific upper body mobility exercises)		AQLQ, ACQ7	Number of participants with exacerbation
		Age not reported						
Sodhi 2014 India	Asthma 8 weeks	n=60 39 (10) years 26 (43%) female	n=60 36 (11) years 23 (33%) female	Yoga breathing, 2 sessions per day, 45 min per session	Usual care		AQLQ	'Number of attacks per week'
		FEV_1 not reported						
Soni 2012 India	COPD 8 weeks	n=30 FEV_1 1.5 (0.5) litres	n=30 FEV_1 1.2 (0.3) litres	Yoga breathing, 1 session per day, 40-50 min per session	Usual care			
		Age, sex not reported						
Sun 2003 China	COPD 6 months	n=45 FEV_1 1.5 (0.6) litres	n=45 FEV_1 1.4 (0.6) litres	Breathing exercises, 3 sessions per day, 10 min per session	Usual care			
		69 (8) years; 42 (47%) female						

Tang 2016 China	COPD 8 weeks	n=20 73 (4) years 8 (40%) female FEV_1 1.0 (0.4) litres	n=20 72 (4) years 8 (40%) female FEV_1 0.9 (0.4) litres	Breathing exercises (breathing manoeuvre#), 3 sessions per day, 15 min per session	Usual care	mMRC scale	SGRQ	
Turan 2020 Turkey	Asthma 6 weeks	n=56 37 (10) years 49 (88%) female FEV_1 93 (19) %pred	n=56 40 (9) years 45 (80%) female FEV_1 86 (18) %pred	Yoga breathing, 2 sessions per week, 60-90 min per session	Usual care		AQLQ	
Van Gestel 2012 Germany	COPD 4 weeks	n=20 66 (6) years 11 (55%) female FEV_1 47 (20) %pred	n=20 66 (7) years 12 (60%) female FEV_1 47 (17) %pred	Breathing retraining with biofeedback (10 sessions, 30 min per session) AND Exercise training (10 supervised sessions, 3 sessions per week, 90 min per session; strength training, cycle ergometer started at 30% peak workload for 20 min)	Exercise training	CRQ (dyspnoea domain)	CRQ	
Vedanthan 1998 United States	Asthma 16 weeks	n=9 mean 28 years 3 (33%) female FEV_1 mean 3.2 litres	n=8 mean 25 years 6 (75%) female FEV_1 mean 4 litres	Yoga breathing, 3 sessions per week, 45 min per session	Usual care			
Vempati 2009 India	Asthma 8 weeks	n=29 34 (11) years 6 (21%) female FEV_1 70 (17) %pred	n=29 33 (12) years 8 (28%) female FEV_1 63 (19) %pred	Yoga breathing, 5 sessions per week, 90 min per session	Usual care		AQLQ	
Wu 2006 China	COPD 12 weeks	n=20 70 (6) years 0 (0%) female	n=10 70 (7) years 0 (0%) female	Breathing exercises (DB and PLB)	Usual care			

		FEV_1 30 (11) %pred	FEV_1 32 (12) %pred					
Yamaguti 2012 Brazil	COPD 4 weeks	n=15 mean 67 (95%CI 54 to 78) years 4 (27%) female FEV_1 mean 43 (95%CI 24 to 63) %pred	n=15 mean 66 (95%CI 54 to 78) years 4 (27%) female FEV_1 mean 42 (95%CI 18 to 7) %pred	Breathing exercises, 3 sessions per week, 45 min per session	Usual care	mMRC scale	SGRQ	Number of protocol violations due to 'exacerbations or other health problems'
Yan 1996 China	COPD 1-20 months	n=165 62 (11) years 44 (27%) female	n=159 61 (11) years 55 (35%) female	Breathing exercises (DB and PLB), 2-4 sessions per day, 15-30 min per session	Placebo ("healthy lung capsule" twice daily)			
		FEV_1 not reported						
Yekefallah 2019 Iran	COPD 4 weeks	n=25 6 (24%) female Age, FEV_1 not reported	n=25 64 (13) years 7 (28%) female FEV_1 not reported	Breathing exercises (DB and PLB), 4 sessions per day, 20 min per session	Usual care			
Yuce 2020 Turkey	Asthma 4 weeks	n=25 42 (15) years 22 (88%) female FEV_1 2.7 (0.7) litres	n=25 46 (13) years 23 (92%) female FEV_1 2.3 (0.8) litres	Yoga breathing, 1 session per day, 20 min per session	Sham (progressive relaxation training)		AQLQ	
Zakerimoghadam 2011 Iran	COPD 10 days	n=60; "majority of subjects were aging over 70"; 18 (30%) female; FEV_1 not reported		Breathing exercises, 4 sessions per day	Usual care			
Zhang 2008a China	COPD 8 weeks following inpatient	n=20 69 (4) years 3 (15%) female FEV_1 not reported	n=20 70 (2) years 2 (10%) female	Breathing exercises (breathing manoeuvre#), 3 sessions per day, 15 min per session	Usual care	mMRC scale		

	admission for exacerbation	GOLD III n=12; GOLD IV n=8	FEV_1 not reported GOLD III n=13; GOLD IV n=7					
Zhang 2008b China		n=20 70 (4) years 4 (20%) female FEV_1 not reported GOLD III n=13; GOLD IV n=7		Breathing exercises (PLB), 3 sessions per day, 15 min per session				

Data are mean (SD) unless indicated. Participants are clinically stable outpatients unless indicated. ACQ, Asthma Control Questionnaire; AQLQ, Asthma Quality of Life Questionnaire; COPD, chronic obstructive pulmonary disease; CRQ, Chronic Respiratory Disease Questionnaire; DB, diaphragmatic breathing; FEV_1, forced expiratory volume in 1 second; FVC, forced vital capacity; ILD, interstitial lung disease; mMRC, modified Medical Research Council scale; PLB, pursed lip breathing; SGRQ, St George's respiratory questionnaire; SF36, 36-Item Short Form Health Survey. *not all intervention groups/study phases relevant to this review. ^ exercise training: commenced at 60% of VO_2peak, increased to 85%; training duration commenced at 25 min, increased to 45 min. # breathing manoeuvre: quick inspiration to total lung capacity (0.8 to 1.0 seconds), slow expiration (3 to 4 seconds).

Supplementary Table 3. Study inclusion and exclusion criteria

Study	Inclusion and exclusion criteria
COPD	
Ambrosino 1981	INCLUSION male, “recently discovered COPD… not been submitted to any prior therapy”, mild degree chronic airway obstruction
	EXCLUSION bronchial asthma, tuberculosis or other relevant diseases, cor pulmonale
Ceyhan 2022	INCLUSION age ≥18 years, diagnosed ≥3 months, inhalers ≥twice daily, no previous breathing exercise training or rehabilitation program
	EXCLUSION mental disorders, communication disabilities, heart disease that could lead to dyspnoea, unstable angina
Chan 2011	INCLUSION independently ambulant
	EXCLUSION severe sensory or cognitive impairment, symptomatic ischaemic heart disease, participation in Tai Chi Qigong within 1 year
Chauhan 1992	INCLUSION severe disease (FEV_1<1 litre ≥3 separate clinic assessments)
	EXCLUSION not reported
Collins 2008	INCLUSION age ≥40 years, PaO_2 ≥56 mmHg at rest,mean SpO_2 ≥85% at peak exercise (+/- supplemental oxygen), stable clinical condition without an exacerbation during preceding 6 weeks, MMSE score >23
	EXCLUSION significant cardiovascular, neuromuscular or orthopaedic impairments that could interfere with exercise testing
Collins 2014	INCLUSION age >40 years of age, stable clinical condition without exacerbation ≥4 weeks, ability to walk on a treadmill
	EXCLUSION primary asthma, congestive heart failure New York Heart Association Class III-IV, cardiovascular, neuromuscular or orthopedic impairments that could interfere with exercise testing, participated in a formal exercise program within previous 12 weeks
Collins 2019	INCLUSION age ≥40 years, SpO_2 ≥90% at peak exercise (+/- supplemental oxygen), stable clinical condition, able to hear metronome sounds, lives near Hines, IL (Chicagoland area)
	EXCLUSION respiratory infection/exacerbation within 4 weeks, exercise limiting heart disease (+ stress test or other indicators of heart disease or complaints of angina during the stress test), primary asthma, Congestive heart failure (New York Heart Association Class III or IV), exercise-limiting peripheral arterial disease (stops exercise due to intermittent claudication), stops exercise due to arthritic pain in the knee or hips (self-report), inability to walk on the treadmill, pregnancy, any unforeseen illness or disability that would preclude exercise testing or training, participation in a formal exercise program within the previous 12 weeks
Dekhordi 2021	INCLUSION age 15 to 70 years, inpatient, lack of cognitive impairment, stability of physical conditions, ability to attend training sessions, absence of serious disease (including malignancy, diabetes, immunocompromised condition and stroke)
	EXCLUSION exacerbation [during the study]
Donesky 2012	INCLUSION age ≥40 years, stable clinical condition, dyspnoea symptoms in daily life, if receiving Supplementary oxygen: SpO_2≥ 80% on ≤6L/min during 6MWT

	EXCLUSION active symptomatic illness, participation in pulmonary rehabilitation, yoga, or exercise training within 6 months
Feng 2010	INCLUSION inpatient admission for exacerbation
	EXCLUSION other cardiorespiratory disease, pleural diseases or thoracic deformity
Feng 2016	INCLUSION severe to very severe disease, stable clinical condition over previous 4 weeks (no exacerbation, no oral or inhaled steroid)
	EXCLUSION not reported
Gu 2018	INCLUSION age ≥50 years, moderate or severe disease, stable clinical condition over previous 4 weeks (no exacerbation, no dyspnoea symptoms in daily life), no diagnosis of bronchial asthma
	EXCLUSION complicated with respiratory failure, disorders involving pleural cavity, thoracic wall, bone and joint, or neurological or muscular system, history or previously diagnosed with major disorders including cardiac, hepatic, or renal disorders or tumours, psychological or cognitional abnormalities, previous participation in pulmonary rehabilitation
Kaminsky 2017	INCLUSION age ≥18 years, stable clinical condition over previous 4 weeks, mMRC scale score >2, not enrolled in pulmonary rehabilitation or practicing yoga, non-smoker
	EXCLUSION not reported
Katiyar 2006	INCLUSION severe, stable clinical condition
	EXCLUSION age <40 years, history or spirometric evidence of asthma, requirement for Supplementary oxygen, recent hospitalisation, $PaCO_2$ >50mmHg, cardiac disease, cor pulmonale, abnormal liver, renal or haematological profile, poor compliance
Lausin 2009	INCLUSION FEV_1 between 30% and 80% predicted; 5 days free of acute exacerbation
	EXCLUSION not reported
Lee 2022	INCLUSION age 40 to 80 years, mMRC scale score ≥2
	EXCLUSION serious respiratory illness other than COPD, acute deterioration within 2 weeks, change in FEV_1 or FVC of 12% and 200 mL, other illnesses that may cause death or disability during 1-year period, difficulty walking, unstable cardiovascular disease, severe untreated pulmonary hypertension, alcoholics or those with a history of substance abuse, medication from another clinical trial within 30 days, current smoker, pregnant, breastfeeding
Li 2002	INCLUSION not reported
	EXCLUSION not reported
Li 2018	INCLUSION age 40 to 80 years, stable clinical condition over previous 4 weeks, no regular exercise program for ≥6 months
	EXCLUSION acute exacerbation of COPD, bronchiectasis, bronchial asthma, bronchial tumour, tuberculosis or cancer, severe cardiovascular, cerebrovascular, liver, kidney, or hematopoietic system disease, mental disorder, extremely weak or physical disability, pregnant, breastfeeding
Lin 2012	INCLUSION no previous respiratory training
	EXCLUSION acute asthma exacerbation, other respiratory disease under active treatment, heart failure, pregnant
Lin 2019	INCLUSION age ≥40 years

	EXCLUSION long-term oxygen therapy, visited emergency room or were hospitalized within previous month, atrial fibrillation, severe cognitive impairment, >class II heart failure as defined by the New York Heart Association (NYHA) functional classification in previous 6 months, pacemaker, cancer treatment, participation in other exercise trial
Liu 2013	INCLUSION stable clinical condition (no oral glucocorticoid treatment within 3 months), no history of bronchial asthma, test for bronchiectasis was negative, computer with Internet access was available in the home, "All subjects were familiar with logging onto the Internet, navigating their way to a website, and using a computer mouse, and were able to watch an instruction video and graph on the computer screen and listen to an instructional audio with relaxing music"
	EXCLUSION malignancy, cardiac failure, distal arteriopathy, severe endocrine, hepatic or renal disease
Nese 2022	INCLUSION age ≥18 years, diagnosed for ≥6 months
	EXCLUSION physical and mental health illness, hearing problems, heart failure or anaemia
Nield 2007	INCLUSION no exacerbation in last 4 weeks, dyspnoea during walking, modified Borg score ≥3 on 6MWT
	EXCLUSION not reported
Peng 2021	INCLUSION age ≥18 years no other organic diseases, no record of adverse effect from drugs, substance abuse or history of smoking and alcoholism
	EXCLUSION lung cancer, asthma and bronchiectasis, mental disorders, family history of hereditary diseases
Ranjita 2016	INCLUSION age 36 to 60 years, male, stable clinical condition ≥3 months, moderate to severe, coal miners, able to walk without aid, non-smoker
	EXCLUSION recent COPD exacerbation, respiratory tract infection within previous month, unstable angina, myocardial infarction, angioplasty, heart surgery in the previous 3 months, basal blood pressure >180/100 mmHg, resting PR >120 bpm, BMI >35 kg/m^2, injury-free, no history of hospitalization, neuromuscular conditions interfering with exercise tests, previous participation in yoga program, ex-smoker
Saunders 1965	INCLUSION diagnosis of chronic bronchitis (persistent cough, sputum on most days for >3 months, short of breath)
	EXCLUSION not reported
Soni 2012	INCLUSION mild and moderate disease severity
	EXCLUSION history of exacerbation or respiratory tract infections, tuberculosis, diabetes or any other disorder, current smoker, pregnant, breastfeeding
Sun 2003	INCLUSION age ≥60 years, GOLD severity II and III, stable clinical condition over previous 4 weeks
	EXCLUSION bronchial asthma, bronchiectasis, ischaemic heart disease, diabetes, hypertension
Tang 2016	INCLUSION age >40 years, severe and extremely severe GOLD severity C-D, stable clinical condition over previous 4 weeks (no exacerbation, no oral or inhaled steriod), negative bronchodilation test
	EXCLUSION not reported

Van Gestel 2012	INCLUSION age 40 to 75 years, stable clinical condition (no changes in medication dosage or frequency of administration, no clinical signs or symptoms of acute exacerbations and no hospital admissions in the preceding 6 weeks), BMI >18 and <25kg/m^2.
	EXCLUSION oxygen desaturation to <80% during exercise on room air, respiratory disorders other than COPD, history of significant inflammatory disease other than COPD, cardiac diseases such as heart failure, cardiac arrhythmia and/or coronary artery disease, primary pulmonary vascular disease, history of lung surgery, diagnosis of cancer, unable to walk, oral corticosteroids and/or vasoactive medication at inclusion
Wu 2006	INCLUSION stable clinical condition
	EXCLUSION not reported
Yamaguti 2012	INCLUSION age 30 to 90 years, post-bronchodilator FEV_1 <80% predicted value, stable condition without changes in medication and symptoms (dyspnea, volume or color of sputum) ≥4 weeks, regular treatment with inhaled bronchodilators and steroids
	EXCLUSION other pulmonary, cardiovascular or musculoskeletal diseases, participation in exercise training program within 2 years, current smoker
Yan 1996	INCLUSION stable clinical condition
	EXCLUSION disease affected by right heart
Yekefallah 2019	INCLUSION severe to moderate disease severity, stable clinical condition
	EXCLUSION symptom exacerbation, serious cardiopulmonary or neuromuscular problems which interfered with performing exercise
Zakerimoghadam 2011	INCLUSION mild or moderate disease severity, did not have other chronic diseases, had not recognized psychotic confusion, did not consume drug in this instance
	EXCLUSION not reported
Zhang 2008	INCLUSION age ≥40 years, GOLD stage III or IV, 4 weeks post exacerbation, negative bronchodilation test, no oral or inhaled steroid
	EXCLUSION severe arrhythmia, chronic heart failure, ischaemic heart disease, severe impaired organ function or tumour, history of mental illness, drug abused, allergy to medication
Asthma	
Agnihotri 2017	INCLUSION age 12 to 60 years, mild to moderate disease severity, non-smoker or ex-smoker (<10 pack/year, ≥6 months)
	EXCLUSION Severe airflow limitation (FEV_1<60%), associated chronic respiratory diseases, major psychiatric illness, pregnant, breastfeeding
Andreasson 2022	INCLUSION ≥2 consultations following referral for lack of asthma control, ACQ6 ≥0.8
	EXCLUSION severe comorbidity e.g. patients with short life expectancy due to terminal illness, or severe physical impairments or mental disease which might interfere with trial participation, current participation in another pulmonary research project, trained in breathing exercises by physiotherapist within 6 months
Baskan 2022	INCLUSION age 18 to 60 years, bronchodilator >6 months

	EXCLUSION one or more severe and/or uncontrolled comorbid conditions (heart failure, dementia, hemiplegia, malignant tumour, moderate and severe liver or kidney failure), psychiatric condition, pregnant, breastfeeding
Bhatt 2016	INCLUSION not reported
	EXCLUSION complicating coronary artery disease, valvular heart diseases, hypertension, diabetes mellitus and any other systemic illness
Bidwell 2012	INCLUSION FER <0.8, daily use of bronchodilator, symptoms of wheezing and/or coughing for ≥2 years that improves either spontaneously or with drug therapy
	EXCLUSION hypertension, major orthopaedic injuries prohibiting the performance of various yoga postures, taking any medications that would alter autonomic function, participation in yoga therapy within 12 months, current smoker ≥2 cigarettes/day
Bruton 2018	INCLUSION age 16 to 70 years, ≥1 anti-asthma medication prescription in previous year, AQLQ score <5.5
	EXCLUSION documented diagnosis of COPD, asthma in need of urgent medical review at baseline
Cooper 2003	INCLUSION age 18 to 70 years, pre-bronchodilator FEV_1 ≥50% predicted, stable clinical condition over previous 4 weeks (inhaled β2 agonist ≥2 per week, regular inhaled corticosteroids, no change in dose), mean daily symptom score ≥1 , non-smoker
	EXCLUSION taking treatment other than sodium cromoglycate
Coulson 2022	INCLUSION age ≥65 years, persistent asthma (daily need for controller medication)
	EXCLUSION other significant respiratory disease, significant cognitive impairment which might interfere with trial participation, current participation in another research study, already performing breathing exercises independently, current smoker or >20 pack-year smoking history
Fluge 1994	INCLUSION mild disease severity
	EXCLUSION exacerbation 8 weeks before the beginning of the stud, cardiopulmonary complications due to asthma, current smoker
Georga 2019	INCLUSION age ≥18 years
	EXCLUSION change in asthma medication within 1 month, diseases or syndromes with symptoms similar to asthma, use of psychotropic medication, asthma symptoms due to non-respiratory causes (e.g. left ventricular failure), use of another stress-management technique (e.g. autogenic training)
Girodo 1992	INCLUSION not reported
	EXCLUSION history of allergies, severe asthma, chest disease, diabetes, inability to make 26-week commitment
Grammatopoulou 2011	INCLUSION adults, stable clinical condition
	EXCLUSION age ≥60 years, use of oral corticosteroids within 3 months, heart failure, previous participation in an asthma education program, current smoker
Gupta 2015	INCLUSION age 20-55 years
	EXCLUSION chronic chest infections, chest deformity, hypertension, diabetes, history of cigarette smoking

Holloway 2007	INCLUSION age 16-70 years, mild to moderate disease severity, commitment to participate for possibly 8 attendances, no serious comorbidity
	EXCLUSION
Lathadevi 2012	INCLUSION "uncomplicated"
	EXCLUSION other lung disorders, acute exacerbation of asthma, current smoker
Laurino 2012	INCLUSION ≥3 symptoms of panic and agoraphobia, persistent fear of public places or open areas or the need to be removed from fear situations that trigger the crisis
	EXCLUSION not reported
Lehrer 1997	INCLUSION abnormal spirometry (FEV_1 <80% or FEF 50% < 60%) over previous 12 months
	EXCLUSION history of chronic bronchitis or sinusitis, history or physical findings consistent with emphysema or non-asthma respiratory disease, cardiovascular or neurological disease, or a psychiatric disorder requiring the administration of psychoactive medication or might interfere with trial participation, previous training in self-regulation procedure (biofeedback, relaxation, yoga, tai-chi, etc.), history of cigarette smoking within 2 years
Lehrer 2004	INCLUSION age 18 to 65 years
	EXCLUSION disorder that would impede performing the biofeedback procedures, abnormal diffusing capacity, current practice of any relaxation, biofeedback or breathing technique
Meuret 2007	INCLUSION age 18 to 60 years, non-smoker
	EXCLUSION use of oral corticosteroids within 3 months, cardiovascular disease, neurological disorders, clinically significant levels of depression, or lifetime diagnosis of schizophrenia, dementia or psychosis
Opat 2000	INCLUSION age 18 to 50 years
	EXCLUSION regularly taking oral corticosteroids or >1600 micrograms of inhaled steroid per day, taking <3 doses of inhaled bronchodilator medication per week, severe asthma exacerbation within 6 weeks, previous Buteyko technique training
Pourdowlat 2019	INCLUSION not reported
	EXCLUSION any condition pretending asthma and its respiratory manifestations, infection, chronic disease
Prasanna 2015	INCLUSION age 25 to 60 years, newly diagnosed
	EXCLUSION chronic asthma, current smoker
Prem 2013	INCLUSION age 18 to 60 years, AQLQ score <5.5; bronchodilator >6 months; no exacerbation in preceding 8 weeks
	EXCLUSION medical conditions which might interfere with trial participation, non-compliance >15% of study period, previous breathing retraining, pregnant
Pushpa 2018	INCLUSION age 18 to 50 years, diagnosis ≥6 months, mild to moderate disease severity, inhaled β-agonist with stable medication dose for past month

	EXCLUSION concomitant respiratory disease, history of tuberculosis, status asthmaticus, chronic medical condition that required oral/systemic steroids in the past months, medical condition that contraindicated exercise, diabetes mellitus, renal failure, coronary artery disease, musculoskeletal deformities, participation in yoga or similar discipline within 6 months, current smoker, pregnant
Sabina 2005	INCLUSION age ≥18 years, mild to moderate disease severity ≥6 months; taking ≥1 of inhaled β-agonists, methyl-methylxanthines, anticholinergics, ICS, leUnited Kingdomotriene inhibitors or receptor antagonists, or mast cell-stabilizing agents ≥6 months, stable medication dosing for past month
	EXCLUSION concomitant respiratory disease, only exercise-induced asthma, chronic medical condition that required oral corticosteroids in past month, medical condition that contraindicated exercise, unstable medical condition, participation in yoga within 3 years, current smoker (or in past year), smoking history >5 pack-years, pregnant
Sangeethalaxmi 2022	INCLUSION age 18-30 years, mild to moderate disease severity, not previously receiving yoga therapy, non-smokers or not smoked for ≥6 months
	EXCLUSION severe asthma, associated chronic respiratory disease, hypertensive, acute infection within 6 weeks, other serious systemic illness, e.g. hepatic, renal, cardiac or central nervous system, major psychiatric illness, pregnant, breastfeeding
Satpathy 2016	INCLUSION symptoms ≥6 months despite optimum therapy
	EXCLUSION acute infection within 6 weeks, serious systemic illness (hepatic, renal, cardiac or central nervous system), cardiovascular diseases including hypertension, smoking within the past year
Singh 2012	INCLUSION age 18 to 60 years, mild to moderate disease severity, non-smoker
	EXCLUSION history of exacerbation or respiratory tract infections, any other disorder, pregnant, breastfeeding
Slader 2006	INCLUSION age 15 to 80 years, stable sub optimally controlled asthma, as-needed reliever use ≥4 occasions/week, use of ICS (≥200 mg/day ≥3 months, no dose change during previous 4 weeks), FEV_1 >50% and <90% predicted or FER <0.7, daily access to television/video player
	EXCLUSION recently unstable asthma, previous Buteyko technique training, current smoker or ex-smokers ≥10 pack-year
Sodhi 2014	INCLUSION age 17 to 50 years, "well controlled", non-smoker
	EXCLUSION history of tuberculosis, COPD, respiratory tract infection within 6 weeks, diabetes, renal failure, coronary artery disease and musculoskeletal chest deformities, current participation in regular exercise training
Turan 2020	INCLUSION age 18 to 55 years, diagnosed ≥6 months, living in the city centre
	EXCLUSION another respiratory system disease, current exacerbation, physical disease or cognitive deficiency, psychiatric disease diagnosis which might interfere with trial participation, participation in regular exercise program within 6 months
Vedanthan 1998	INCLUSION not reported
	EXCLUSION not reported
Vempati 2009	INCLUSION age ≥18 years, mild to moderate disease severity ≥6 months, taking ≥1 of inhaled β-agonists, methyl-methylxanthines, anticholinergics and ICS, stable medication for past month

	EXCLUSION concomitant respiratory disease, chronic medical condition requiring oral or systemic corticosteroids in the past month, medical condition that contraindicated exercise, unstable medical condition, taking leUnited Kingdomotriene inhibitors or receptor antagonists or mast cell-stabilising agents ≥6 months, participation in yoga or similar discipline within 6 months, smoking history >5 pack-years, pregnant
Yuce 2020	INCLUSION age ≥18 years, "chronic asthma" for 6 months, asthmas were not /partly under control, β2 agonist and/or inhaling corticosteroid ≥2x/week, inhaler bronchodilator stable dose past month
	EXCLUSION diseases such as COPD, tuberculosis, respiratory infection, diabetes and coronary artery disease, those who did not participate in >15% of the applications were excluded, current participation in regular exercise training or complementary and integrative health applications, current smoker, pregnant, breastfeeding
ILD (n=1)	
Shen L 2021	INCLUSION age 50 to 80 years, no other ILDs with known causes, including family history, occupational exposure, connective tissue disease, and drug-related toxic side effects
	EXCLUSION no respiratory or systemic infection within 4 weeks, malignant tumour, severe disease in other system, organ dysfunction, unable to tolerate the breathing exercise, poor compliance, participation in other clinical trials within 3 months, pregnant, breastfeeding, planning to become pregnant, or unable to use effective contraception
Mixed COPD/asthma	
Ozer 2021	INCLUSION age 18 to 55 years, diagnosed ≥6 months
	EXCLUSION any respiratory system diseases than asthma and COPD, no current exacerbation, physical or psychiatric disease or cognitive disability to prevent understanding the training, any disease that cause sleeplessness, using sleeping pills, internet access, able to use the internet, ability to download and use ZOOM program on telephone/computer, participation in similar exercise program within 6 months

Supplementary Table 4. Descriptive results for critical outcome: Breathlessness

	Diagnosis	Timepoint	Outcome measure	Intervention		Comparator		Between-group difference MD (95% CI)
				n	Mean (SD)	n	Mean (SD)	
Chauhan 1992	COPD	8 weeks	Visual analogue scale rating	11	Median 30	11	Median 36.5	Median difference -9 (-18 to -1)
Collins 2008	COPD	12 weeks	Borg score at isotime	17	1.3 (1.4)	16	2.2 (2.4)	-0.9 (-2.25 to 0.45)
Collins 2014	COPD	6 -week follow-up	CRQ dyspnoea domain score	31	4.52 (1.26)	25	4.00 (1.38)	0.52 (-0.18 to 1.22)
Donesky 2012	COPD	12 weeks	CRQ dyspnoea domain score	5	3.36 (1.26)	9	3.04 (1.32)	0.32 (-1.08 to 1.72)

Feng 2010a	COPD	4 weeks	mMRC scale	30	1.15 (0.7)	29	2.64 (0.35)	-1.49 (-1.67 to -1.31)
Feng 2010b				30	1.98 (0.24)			-0.66 (-0.81 to -0.51)
Grammatopoulou 2011	Asthma	6 months	mMRC scale	20	1.05 (0.22)	20	1.25 (0.64)	-0.20 (-0.50 to 0.10)
Nese 2022	COPD	10 weeks	D12 physical subscale score	38	5.84 (3.94)	39	17.26 (7.84)	-11.42 (-14.18 to -8.66)
			D12 emotional subscale score		2.58 (3.11)		9.62 (5.41)	-7.04 (-9.00 to -5.08)
			D12 total score		8.42 (6.53)		25.87 (11.99)	-17.45 (-21.75 to -13.15)
Nield 2007	COPD	12 weeks	SOB-Q score	10	59 (17)	9	69 (24)	-10 (-28.9 to 8.9)
Zhang 2008a	COPD	8 weeks	mMRC scale	17	1.94 (1.19)	15	3.4 (0.91)	-1.46 (-2.19 to -0.73)
Zhang 2008b				15	2.4 (1.12)			-1.00 (-1.73 to -0.27)

Supplementary Table 5. Descriptive results for important outcome: Health-related quality of life

	Diagnosis	Timepoint	Outcome measure	Intervention		Comparator		Between-group difference MD (95% CI)
				n	Mean (SD)	n	Mean (SD)	
Agnihotri 2017	Asthma	6 months	AQLQ total score	125	5.72 (0.38)	130	5.43 (0.34)	0.29 (0.20 to 0.38)
			AQLQ symptoms subdomain score		5.61 (0.45)		5.32 (0.32)	0.29 (0.19 to 0.39)
			AQLQ activities subdomain score		6.07 (0.21)		5.75 (0.26)	0.32 (0.26 to 0.38)
			AQLQ emotion subdomain score		5.74 (0.39)		5.27 (0.41)	0.47 (0.37 to 0.57)
			AQLQ environment domain score		5.44 (0.06)		5.31 (0.16)	0.13 (0.10 to 0.16)
Andreasson 2022	Asthma	12 weeks	Mini-AQLQ score	94	MD 0.72 (95% CI 0.51 to 0.92)	99	MD 0.16 (95% CI -0.04 to 0.35)	0.56 (0.28 to 0.85)
		6-month follow-up			MD 0.65 (95% CI 0.46 to 0.85)		MD 0.31 (95% CI 0.12 to 0.49)	0.35 (0.07 to 0.62)
		12-month follow-up			MD 0.76 (95% CI 0.57 to 0.95)		MD 0.38 (95% CI 0.19 to 0.56)	0.38 (0.12 to 0.65)
Bidwell 2012	Asthma	10 weeks	SGRQ total score	12	MD 16.01 (SE 3)	8	MD 31.85 (SE 5)	-15.84 (-27.27 to -4.41)
Bruton 2018a	Asthma	12 months	AQLQ total score	261		262		0.28 (0.11 to 0.44)
			AQLQ symptoms subdomain score					0.24 (0.05 to 0.42)
			AQLQ activities subdomain score					0.21 (0.04 to 0.41)
			AQLQ emotion subdomain score					0.38 (0.16 to 0.60)
			AQLQ environment domain score					0.32 (0.11 to 0.53)
Bruton 2018b			AQLQ total score	132		262		0.24 (0.04 to 0.44)
			AQLQ symptoms subdomain score					0.27 (0.04 to 0.49)

			AQLQ activities subdomain score					0.08 (-0.14 to 0.31)
			AQLQ emotion subdomain score					0.43 (0.16 to 0.71)
			AQLQ environment domain score					0.19 (-0.06 to 0.44)
Chauhan 1992	COPD	8 weeks	Visual analogue scale rating	11	Median 48	11	Median 40	Median difference 9 (-3 to 21)
Collins 2014	COPD	8 weeks	CRQ fatigue domain score	31	4.125 (1.475)	25	4.575 (1.3)	-0.45 (-1.18 to 0.28)
			CRQ emotional function domain score		5.029 (1.343)		5.471 (1.1)	-0.44 (-1.08 to 0.20)
			CRQ mastery domain score		5.45 (1.125)		5.6 (1.25)	-0.15 (-0.78 to 0.48)
Cooper 2003	Asthma	6 months	AQLQ total score	23	Median 1.03 [IQR 0.19 to 1.69]	22	Median 0.61 [IQR -0.11 to 0.95]	"None of the Asthma Quality of Life questionnaire domains had changed significantly at 6 months"
			AQLQ symptoms subdomain		Median 1.08 [IQR 0.08 to 1.92]		Median 0.33 [IQR -0.19 to 1.17]	
			AQLQ activities subdomain		Median 0.91 [IQR 0.18 to 1.36]		Median 0.50 [IQR 0.09 to 1.14]	
			AQLQ emotion subdomain		Median 1.00 [IQR 0.20 to 2.20]		Median 0.40 [IQR -0.35 to 1.00]	
			AQLQ exposure to environmental stimuli dimension score		Median 1.00 [IQR 0.0 to 1.75]		Median 0.38 [IQR -0.25 to 1.06]	
			SF36 physical limitations domain		Median 25.0 [IQR 0.0 to 50.0]		Median 0.0 [IQR -6.3 to 0.0]	"Changes in quality of life, as measured by the SF36 questionnaire, did not differ significantly apart from one of the eight dimensions ("Role limitation due to
			SF36 physical function dimension score		Median 5.0 [IQR 0.0 to 5.0]		Median 0.0 [IQR -10.0 to 5.0]	
			SF36 emotional limitations domain score		Median 0.0 [IQR 0.0 to 0.0]		Median 0.0 [IQR 0.0 to 0.0]	

			SF36 social performance domain score		Median 0.0 [IQR 0.0 to 11.1]		Median 0.0 [IQR -25.0 to 0.0]	physical problems") which improved more in the Buteyko technique group at… 6 months (p<0.01)"
			SF36 mental health domain score		Median 0.0 [IQR -8.0 to 12.0]		Median 2.0 [IQR -8.0 to 8.0]	
			SF36 vitality domain score		Median 0.0 [IQR -10.0 to 20.0]		Median 0.0 [IQR -10.0 to 10.0]	
			SF36 bodily pain domain score		Median 0.0 [IQR -11.1 to 11.1]		Median 0.0 [IQR -11.1 to 11.1]	
			SF36 general health domain score		Median 5.0 [IQR -12.0 to 30.0]		Median 0.0 [IQR -5.5 to 5.8]	
			SF36 change in health domain score		Median 25.0 [IQR 0.0 to 50.0]		Median 0.0 [IQR 0.0 to 25.0]	
Coulson 2022	Asthma	4 weeks	Mini-AQLQ score	45	3.9 (15.6)	45	5.9 (14.0)	-2.00 (-8.12 to 4.12)
Donesky 2012	COPD	12 weeks	SF36 mental component score	14	54.8 (8.0)	15	52.3 (9.6)	2.50 (-3.92 to 8.92)
			SF36 physical component score		35.4 (9.7)		36.8 (8.8)	-1.40 (-8.16 to 5.36)
			CRQ fatigue domain score		4.2 (1.275)		4.075 (1.3)	0.13 (-0.81 to 1.06)
			CRQ emotional function domain score		5.057 (0.843)		5.014 (0.886)	0.04 (-0.59 to 0.67)
			CRQ mastery domain score		5.575 (1)		4.85 (1.325)	0.73 (-0.13 to 1.58)
Georga 2019	Asthma	8 weeks	Mini-AQLQ symptoms subdomain score	23	0.104 (0.16)	29	−0.01 (0.46)	0.11 (-0.07 to 0.29)
			Mini-AQLQ activity subdomain score		0.17 (0.16)		0.01 (0.06)	0.16 (0.09 to 0.23)
			Mini-AQLQ emotion subdomain score		0.78 (0.49)		0.02 (0.14)	0.76 (0.55 to 0.97)
Grammatopoulou 2011	Asthma	6 months	SF36 mental component score	20	52.30 (5.40)	20	48.79 (6.31)	3.51 (-0.13 to 7.15)

			SF36 physical component score		46.52 (12.24)		48.04 (6.25)	-1.52 (-7.54 to 4.50)
Holloway 2007	Asthma	6 months	SGRQ total score	33	15.9 (14.0)	45	16.3 (12.2)	-0.40 (-6.36 to 5.56)
			SQRQ symptoms domain score		21.8 (18.1)		32.8 (20.1)	-11.00 (-19.52 to -2.48)
			SGRQ impact domain score		11.5 (11.5)		10.8 (11.0)	0.70 (-4.37 to 5.77)
			SGRQ activities domain score		20.4 (18.8)		17.0 (17.5)	3.40 (-4.80 to 11.60)
		12-month follow-up	SGRQ total score	32	15.2 (10.9)	40	16.7 (11.6)	-1.50 (-6.71 to 3.71)
			SQRQ symptoms domain score		24.9 (17.9)		33.5 (15.9)	-8.60 (-16.52 to -0.68)
			SGRQ impact domain score		19.0 (15.7)		18.4 (18.9)	0.60 (-7.39 to 8.59)
			SGRQ activities domain score		10.0 (10.1)		10.4 (10.7)	-0.4 (-5.2 to 4.4)
Laurino 2012	Asthma	12 weeks	AQLQ "Variation of the domain: adherence to treatment"	20	median 99.9 [IQR 99.9 to 4.1]	18	median 83.9 [IQR 99.8 to 66.0]	p=0.05
			AQLQ "Variation of the domain: severity/frequency"		median 3.7 [IQR 6.0 to 3.4]		median 4.5 [IQR 6.5 to 3.2]	p=0.012
			AQLQ "Variation of the domain: physical limitation"		median 18.0 [IQR 26.9 to 10.4]		median 26.3 [IQR 36.3 to 12.3]	p=0.001
			AQLQ "Variation of the domain: psychosocial"		median 54.9 [IQR 73.8 to 36.0]		median 48.9 [IQR 62.0 to 36.0]	p=0.01
			AQLQ "Variation of the domain: social-economic"		median 75.3 [IQR 82.9 to 51.0]		median 49.7 [IQR 82.7 to 49.7]	p=0.01
Lee 2022	COPD	8 weeks	CAT	8	4.2 (5.2)	9	1.0 (2.2)	3.20 (-0.68 to 7.08)

Li 2018	COPD	6 months	SGRQ total score	17	−16.18 (SE 2.4)	19	3.84 (SE 2.88)	−22.76 (−29.06 to −16.46)
			SQRQ symptoms domain score		−26.18 (SE 4.33)		5.95 (SE 2.8)	−30.02 (−40.21 to −19.83)
			SGRQ impact domain score		−13.24 (SE 2.99)		8.32 (SE 2.46)	−19.19 (−27.22 to −11.16)
			SGRQ activities domain score		−16.12 (SE 3.64)		6.58 (SE 2.14)	−24.44 (−33.05 to −15.83)
Nield 2007	Asthma	12 weeks	SF36 physical function	10	37 (24)	9	31 (18)	6.00 (−12.96 to 24.96)
Opat 2000	Asthma	4 weeks	AQLQ total score	18		18		-1.29 (-2.53 to -0.05)
			AQLQ symptoms subdomain score					-1.53 (-3.06 to 0.00)
			AQLQ activities subdomain score					-1.16 (-2.54 to 0.22)
			AQLQ emotion subdomain score					-1.59 (-3.04 to -0.15)
			AQLQ environment domain score					-0.87 (-2.18 to 0.44)
Pourdowlat 2019	Asthma	6 weeks	SF36 general health domain score	30	68.33 (SE 16.33)	39	64.27 (SE 20.38)	4.06 (-47.13 to 55.25)
			SF36 physical performance domain score		55.33 (SE 21.08)		22.40 (SE 29.31)	32.93 (-37.83 to 103.69)
			SF36 physical limitations domain score		82.27 (SE 20.37)		43.00 (SE 36.98)	39.27 (-43.48 to 122.02)
			SF36 emotional limitations domain score		64.73 (SE 19.70)		47.13 (SE 18.16)	17.60 (-34.91 to 70.11)
			SF36 bodily pain domain score		63.40 (SE 14.60)		62.80 (SE 14.06)	0.60 (-39.13 to 40.33)

			SF36 social performance domain score		66.33 (SE 17.26)		47.33 (SE 22.78)	19.00 (-37.02 to 75.02)
			SF36 vitality domain score		74.73 (SE 14.44)		48.27 (SE 31.5)	26.46 (-41.46 to 94.38)
			SF36 mental health domain score		71.53 (SE 14.34)		36.33 (SE 19.61)	35.20 (-12.41 to 82.81)
			SF36 quality of life domain score		546.67 (SE 90.12)		352.53 (SE 99.91)	194.14 (-69.57 to 457.85)
Prem 2012a	Asthma	12 weeks	AQLQ total score	39		40		0.97 (0.48 to 1.46)
			AQLQ symptoms subdomain score					1.01 (0.44 to 1.59)
			AQLQ activities subdomain score					1.32 (0.81 to 1.83)
			AQLQ emotion subdomain score					0.65 (-0.01 to 1.31)
			AQLQ environment domain score					0.91 (0.13 to 1.69)
Prem 2012b		12 weeks	AQLQ total score	36		40		0.50 (0.01 to 0.98)
			AQLQ symptoms subdomain score					0.69 (0.13 to 1.26)
			AQLQ activities subdomain score					0.79 (0.28 to 1.30)
			AQLQ emotion subdomain score					0.17 (-0.48 to 0.83)
			AQLQ environment domain score					0.33 (-0.43 to 1.10)
Sabina 2005	Asthma	16 weeks	Mini-AQLQ	29	0.57 (SE 0.37)	33	0.35 (SE 0.16)	0.22 (-0.57 to 1.01)
Shen 2021	ILD	12 months	SGRQ total score	30	-3.723 (10.35)	29	4.806 (10.359)	-8.53 (-13.81 to -3.24)
Slader 2006	Asthma	28 weeks	AQLQ total score	23	0.60 (0.39 to 0.81)	25	0.44 (0.27 to 0.62)	0.14 (-0.11 to 0.38)

			ACQ7 score		1.08 (0.80 to 1.37)		1.05 (0.77 to 1.32)	0.11 (-0.20 to 0.43)
van Gestel 2012	COPD	4 weeks	CRQ total score	20	0.648 (0.85)	20	0.488 (0.85)	0.17 (-0.10 to 0.43)
Yuce 2020	Asthma	4 weeks	AQLQ total score	25	4.44 (1.20)	25	5.34 (1.05)	-0.90 (-1.53 to -0.27)
			AQLQ symptoms subdomain score		6.44 (0.44)		5.48 (1.21)	0.96 (0.46 to 1.46)
			AQLQ activities subdomain score		6.07 (0.69)		5.13 (1.07)	0.94 (0.44 to 1.44)
			AQLQ emotion subdomain score		6.60 (0.57)		5.46 (1.50)	1.14 (0.51 to 1.77)
			AQLQ environment domain score		6.14 (0.82)		5.36 (1.27)	0.78 (0.19 to 1.37)

Supplementary Table 6. Descriptive results for critical outcome: Adverse events

Study	Diagnosis	Timepoint	Outcome measure	Intervention	Comparator	Odds ratio (95% CI)
Ceyhan	COPD	4 weeks	"withdrawal from follow-up due to other illnesses"	3/32	1/35	
Lehrer 2004	Asthma	10 weeks	Number of participants requiring oral corticosteriods	2/24	4/24	0.45 (0.08 to 2.76)
Lin 2019	COPD	8 weeks	"discontinuation of intervention due to illness"	1/38	1/40	
Opat 2000	Asthma	4 weeks	Number of participants with admission for severe exacerbation	0/16	1/16	0.31 (0.01 to 8.28)
Peng 2021	COPD	4 weeks	Number of participants with "adverse reactions"	4/50	12/50	0.28 (0.08 to 0.92)
Prem 2012	Asthma	12 weeks	Number of participants with exacerbation	5/39	8/40	0.59 (0.17 to 1.99)
Saunders	COPD	12 weeks	Number of participants with "chest cold (defined as increased cough and phlegm for three weeks or more)"	19 (group numbers not described)	18 (group numbers not described)	
Yamaguti 2012	COPD	4 weeks	'protocol deviations…because of either an acute COPD exacerbation or other health problems'	0/15	3/15	

Supplementary Table 7. Sensitivity Analyses.

	Number of RCTs	Participants	Mean difference (95% confidence interval)	I^2
Breathlessness				
Breathing exercises vs usual care				
mMRC dyspnoea scale	3	87	0.07 (-1.33 to 1.47)	0%
Health-related quality of life				
Breathing exercises vs usual care				
SGRQ total score	4	240	-7.28 (-20.49 to 5.93)	96%
SGRQ symptoms	2	193	-11.59 (-23.73 to 0.56)	97%
SGRQ impact	2	193	-6.99 (-21.69 to 7.70)	97%
SGRQ activities	2	193	-7.46 (-25.49 to 10.57)	98%
Yoga breathing vs usual care				
SGRQ symptoms	2	91	-2.5 (-14.04 to 9.04)	73%

All sensitivity analyses conducted by removal of trials that lacked assessor blinding.

mMRC – modified Medical Research Council; SGRQ – St George Respiratory Questionnaire.

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