Supplementary Table S1 – Key components of the CBT Intervention

	Aim
Education /increasing awareness	Increase awareness about COPD, anxiety and panic, role of adrenaline, and depression. Help patients understand the link between physical and psychological symptoms.
Bibliotherapy	Providing written materials for patients to work through independently (Northumberland, Tyne & Wear (NTW) Mental Health Trust Panic Leaflets; NTW Depression & Low Mood Leaflet; Self Help Toolkit).
Cognitive therapy	Identifying, challenging and reconsidering unhelpful thinking or behaviour and identifying more helpful ways of thinking/behaving.
Goal setting	Agree goals important to the patient. Goals are reviewed, and modified to smaller or new goals if needed.
Graded tasks and Behavioral Activation	Reduce avoidance which commonly occurs with anxiety and depression. Increase levels of activity, especially activities which provide a sense of achievement or pleasure, increase confidence and help improve mood.

Breathing Control	Instruction (written and verbal) and practice of breathing techniques that develop confidence in controlling breathing more effectively.
Relaxation/ mindfulness	Help the patient to learn to relax and cope with their physical symptoms.
Distraction	To help use an alternative focus for attention to a patient's breathing to avoid triggers for panic.
Comparing outcomes	Help patients identify and compare the advantages and disadvantages of their thinking or behavior.
Biofeedback	Providing feedback about physiological measurements as part of a behavioral change strategy.
Re-attribution	Identify perceived cause of an experience and identify alternative explanations e.g.
Positive self-talk	Positive self- talk (aloud or silently) for encouragement or reassurance.
Problem solving	Learning to analyze situations and identify strategies to overcome difficulties or any barriers.
Graded exposure	Replace avoidance with graded exposure to anxiety-provoking situations or activities.
Behavioral Experiments	Plan activities to test hypotheses about a particular belief or behavior and re-evaluate these.

Supplementary table S2 – self-reported medication used by patients at baseline (n=279)

Self-Report Respiratory Medication	CBT Group (n-139)- Number/ (percent)	Leaflet Group (n=140) Number / (percent)	Total (n=279) Number / (percent)
Short acting beta agonists	138 (99)	139 (99)	277 (99)
Short acting anticholinergics	1 (1)	2 (1)	3 (1)
Long acting beta agonists	2 (1)	1 (1)	3 (1)
Long acting anticholinergics	128 (93)	132 (94)	187 (67)
Corticosteroids/Long acting beta agonists	133 (96)	134 (96)	267 (96)
Mucolytics	55 (40)	59 (42)	114 (41)
Nebulized short acting bronchodilators	18 (13)	21 (15)	39 (14)
Diuretics	36 (26)	39 (28)	75 (27)
Prepacks (steroids/antibiotics)	48 (35)	53 (38)	101 (36)
Oxygen (short burst)	4 (3)	2 (1)	6 (2)
Oxygen (Long term oxygen therapy)	15 (11)	9 (6)	24 (9)
Oxygen (Ambulatory oxygen)	2 (1)	4 (3)	6 (2)
Anti-depressants	52 (37)	47 (34)	99 (35)
Anxiolytics	14 (10)	6 (4)	20 (7)

Supplementary Table S3 – Differences in mean HADS-Depression scores from baseline and between groups.

	Mean improvement from baseline		Difference in mean improvement (95% CI, p value)
	CBT Group	Leaflet Group	
HADS-Depression score at 3 months	2.20 n=115	1.09 n=121	1.11 (0.19, 2.02, p=0.018)
HADS-Depression score at 6 months	2.35 n=101	1.10 n=99	0.26 (0.25, 2.26, p=0.014)
HADS-Depression score at 12 months	2.15 n=92	1.35 n=79	0.80 (-0.28, 1.88, p=0.15)

CBT- Cognitive behavioral therapy; CI-Confidence Interval; HADS- Hospital Anxiety & Depression Scale.

Supplementary Table S4 – Average competency scores for CFARS rating scale.

Competency	Average Score (scale 0-6)
Focus/structure of session	5
Pacing	4.4
Feedback/summaries	4.5
Integration of CBT skills	4
Collaborative relationship	4.5
Guided discovery	4.4
Interpersonal effectiveness	4.3
Elicit key components (physical symptoms/thoughts/feelings/behavior)	4.4
Application of appropriate change techniques	4.2
Closure of session	4.3