



Psychological flexibility as a predictor of engagement in pulmonary rehabilitation following an acute exacerbation of COPD

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Chronic Obstructive Pulmonary Disease

- World wide leading cause of mortality by 2020 (GOLD, 2013)
- 3 million people in England with COPD (NICE, 2010)
- COPD exacerbations are the second largest cause of unplanned hospital admissions in the UK (Hurst JR et al 2010)
- 30% are hospital readmissions within 90 days (Hurst JR et al 2010)
- COPD hospital admissions, readmissions and deaths in the North East of England is significantly worse (England PH 2016)



COPD Exacerbations

COPD exacerbation is a life threatening condition

A significant increase in breathlessness, chest tightness, cough, sputum
reduced activity, quality of life and psychosocial co-morbidities

“Acute exacerbations of COPD is a worsening of the patient's condition, from the stable state and beyond normal day-to-day variations” (S. Burge, J.A. Wedzicha 2003)

“Breathing the most basic of physical functions is objectively threatened and subjectively difficult” (Livermore 2010)





Pulmonary Rehabilitation



Outpatient exercise and education twice a week for 6 weeks
Assessment-spirometry, exercise capacity, quality of life, mood, goals
Endurance and strength based exercise
Education and behaviour change
Final Assessment exercise capacity/quality of life/mood/goals

(GOLD, 2013,2019; NICE, 2010; BTS, 2013; ATS 2013).



Pulmonary Rehabilitation Evidence (PR National Audit 2017)

Hospital Admission within 180 days of rehabilitation

Completers 24% Non completers-38%

Mean number of bed days

Completers 4.8% Non completers 9.6%

Mortality

90-day mortality from secondary care audit

Completers 0.1% Non completers 1.6%

180 day mortality

Completers 0.5% Non completers 3.2%

Improvements in quality of life, exercise capacity and mood



Poor engagement

Stable COPD PR engagement 40% (Hogg et al 2012; Sewell et al 2006; Cote et al 2005)

9% completion within 6 months after hospitalisation for AECOPD

(Harrison et al 2014)

2% engagement after hospitalisation for AECOPD (BTS PR audit 2015)

Smoking/depression significantly linked to non-attendance (Keating 2011)

Disease severity/morbidities/referrer /travel influence attendance (Keating 2011)



Study research questions

Is there an association between psychological flexibility and engagement in pulmonary rehabilitation within eight weeks following hospitalisation with an exacerbation of chronic obstructive pulmonary disease?

How does psychological (in)flexibility presents within 4 days of an exacerbation of COPD hospital admission?



Study methods and criteria

A mixed-methods study design cross-sectional quantitative phase and cognitive interviews

Inclusion criteria

Participants: Consecutive patients admitted to NTHFT with an AECOPD within 4 days of admission

Diagnosed according to spirometry (Forced Expiratory Volume in one second (FEV1)/ Forced Vital Capacity (FVC) <0.70) or CT scan

Recruited between 09/2017 and 01/2018.

Exclusion criteria

Palliative care, unable to mobilise

Patients receiving psychological therapy (counselling and psychotherapy)

Patients considered to reach severe psychological caseness and/or be at suicide risk



Study questionnaires

Acceptance and Action Questionnaire-II (AAQ-II)

Assesses avoidance consists of seven items with scores ranging from one (never true) to seven (always true). Lower scores indicate less experimental avoidance and greater psychological flexibility.

Engaged Living Scale

ELS measures values The scale consists of 16 items scored on a five point Likert scale (totally disagree 1; disagree slightly 2; neither agree or disagree 3; agree slightly 4; totally agree 5)
The items are divided Valued Living (10 items) and Life Fulfilment (6 items)

The Work and Social adjustment scale (WSAS)

Five questions assessing symptom interference in ability to work, home management, social leisure activities, private activities and social relationships. Scores range from zero (“not at all impaired”) to eight (“very severely impaired”)



Health questionnaires done in COPD exacerbations

COPD disease Assessment Tool (CAT)

The CAT is a validated and reliable measure ($\alpha = .88$) of disease-specific health status. Eight items are assessed on a 6-point scale (0-5) with higher scores indicating greater impairment in health status.

Hospital Anxiety and Depression Scale (HADS)

The questionnaire is a valid measure comprising 14 statements scored on a four point Likert scale ranging from zero to three and are divided into two subscales (anxiety ($\alpha = .68$) and depression ($\alpha = .91$)) which are scored between zero and 21

A score of zero to seven is considered to be in the normal range

A score of eight to 10 suggests a probable presence of anxious or depressed state and scores higher than 11 are indicative of a presence of psychological 'caseness'



Study questionnaires

Psychological flexibility during an AECOPD was assessed within 4 days of a hospital admission for COPD exacerbation using The Acceptance and Action Questionnaire-II (AAQ-II) (n=41) and the Engaged Living Scale (ELS) (n=40).

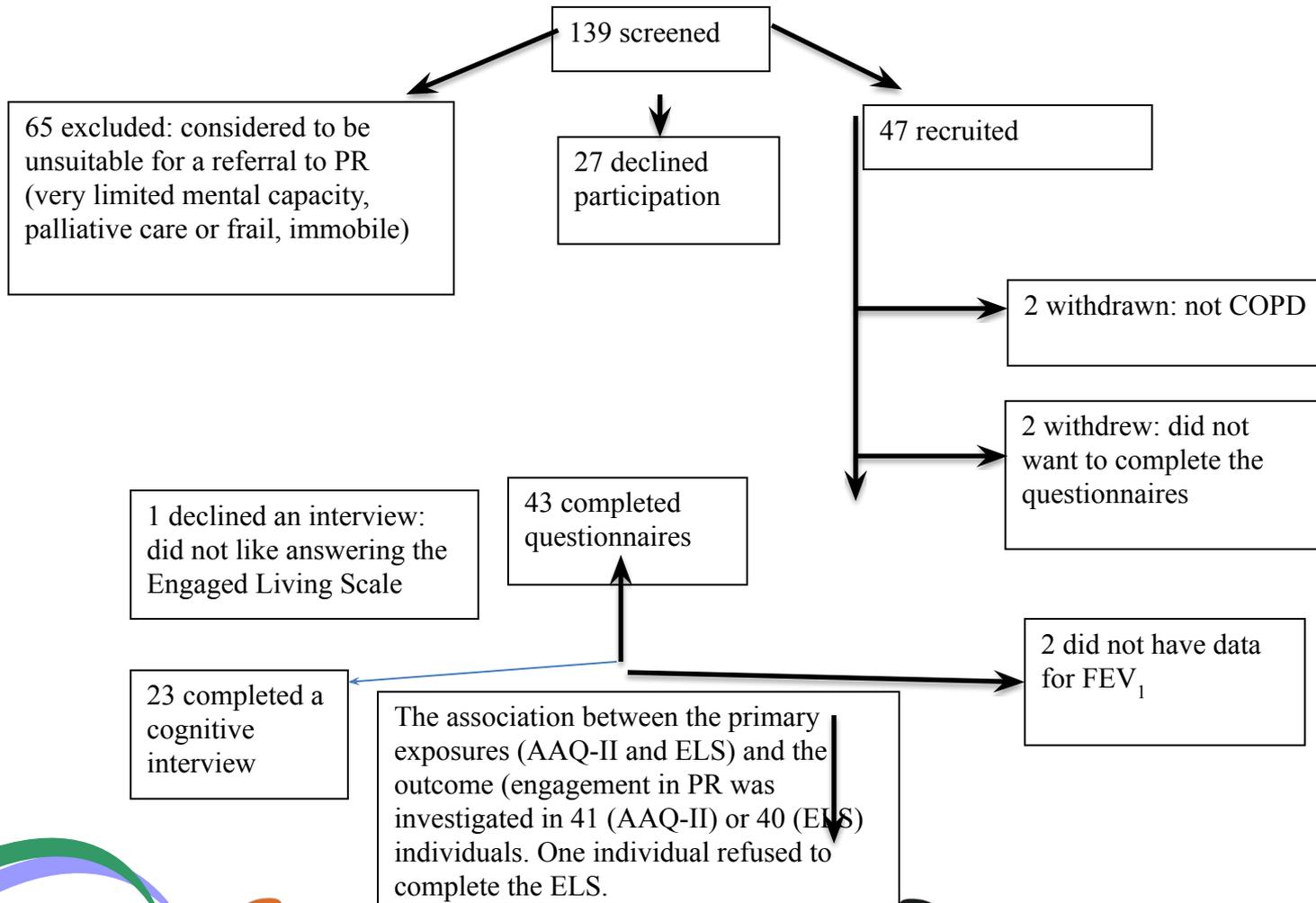
Twenty-three patients also participated in cognitive interviews

Engagement in pulmonary rehabilitation within 8 weeks of a post-COPD exacerbation was recorded





Recruitment



Quantitative analysis

The association between the primary exposures (AAQ-II and ELS) and the outcome (accepting or declining pulmonary rehabilitation) was modelled using penalised logistic regression using a data augmentation method.

Based on a causal diagram, constructed priori we entered the total AAQ-II score (or ELS total score) along with age and FEV1 as independent variables using the Stata® program –penlogit.

We derived the odds ratio for a 2-standard deviation (SD) increment of the primary exposure – essentially, a typically low score (1 SD below the mean) versus a typically high score (1 SD above the mean).



Cognitive interviews

Consecutive patients participated in cognitive interviews with the AAQ-II ,ELS and WSAS to uncover the decision processes that individuals used to answer questionnaire items.

A concurrent, spontaneous verbal probing technique was used where the interviewer “probed” further into the basis of the response (i.e. “was that a hard question to answer?” “why do you think your emotions don’t hold you back”).

Patients were also asked to articulate their reasons for accepting/declining a pulmonary rehabilitation referral



Results

43 people invited to attend PR
21 (49%) verbally accepted a PR referral with the clinician
7 (16%) attended the PR initial assessment
4 (9%) completed the program

An AAQ-II score of 11 translated to a 60% probability of accepting a referral to pulmonary rehabilitation

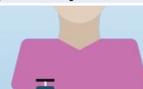
ELS score of 73 was equal to a 68% probability of accepting a referral to pulmonary rehabilitation



Sociodemographic and clinical variables



Variables	Mean (SD) unless stated
Age (years) (n=43)	67.7 (8.4)
Sex n (%)	
Male	19 (44)
Female	24 (56)
FEV ₁ % predicted (n=41)	42.1 (14.5)
FEV ₁ /FVC % (n=41)	46.3 (11.7)
Social status (%) (n=38)	
Alone	58
With someone	42
No of comorbidities (n=43)	3.1 (1.9)
Smoking status (%) (n=43)	
Never	2
Current	42
Ex	56
Home O ₂ (%) (n=43)	
Yes	35
No	65
DECAF score (n=43)	1.3 (1.1)
MUST score (median (IQR)) (n=34)	0 (0-1)



Sociodemographic and clinical variables



Variables	Mean (SD) unless stated
Previous PR (%) (n=43)	
Yes	30
No	70
No. of respiratory-related hospital admissions (in previous 12m) (n=43)	1.2 (1.9)
AAQ-II total scale score (n=43)	22.9 (12.3)
ELS total scale score (n=42)	60.6 (12.6)
Valued living score	40.6 (8.1)
Engaged living score	20.0 (7.1)
WSAS total score (n=43)	26.4 (10.0)
CAT (n=43)	28.0 (8.1)
HADS (n=42)	
Anxiety	9.7 (5.1)
Depression	8.5 (4.3)



Family is the priority

“I make time for the things that I consider important family and all that, they’re top priority”

“Because of work and life experiences with 4 children, 11 grandchildren and so on and so forth you build up a set of values that you can live by, caring, enjoying your company and your families company as best you can”



Self as abnormal

“I just want to be normal, with no bad chest or anything like that. Tablet free.”

“I know what I’d like to do ... just walk about without this oxygen on and be normal again”



Can't do anything Versus I do what I can

“So I just don't bother going out now., so I'm not really living life to the full am I? I used to always love going out – karaoke and all sorts. I can't do it now...”

“...your life itself is only what you make it and therefore you've got to, if something's not working you've got to put something in its place...”



Disability and related emotions, as barriers to action

“Sometimes I can get right in a mood just because it’s kicking off and I’m getting nervous because it’s kicking off; I know my chest is going to go. I know when I’m going to get a chest infection or whatever and that’s when I get, like I said, I lose them values then”

“Well if I’m feeling down in the dumps I wouldn’t want to be doing things. Or going places, if I was too far down”



Limitations

Sample reported high levels of physical disability and significant physical discomfort in hospital

Exploring pulmonary rehabilitation with one's personal goals and values is challenging during a COPD exacerbation

Small sample size (43) there is the possibility of a Type M (magnitude) error
In small-sample, low-power scenarios, statistically significant effects may be exaggerated substantially versus the true population association

Qualitative themes were developed with psychological flexibility in mind.



Conclusion

Psychological flexibility is associated with a greater likelihood of accepting a referral to pulmonary rehabilitation following a COPD exacerbation.

Delivering pulmonary rehabilitation in a way that enables individuals to engage in meaningful activity with family members, might improve attendance at PR following hospitalisation with an AECOPD.



Future Directions

ACT, which engenders psychological flexibility, is worth testing as a means to support attendance at pulmonary rehabilitation

