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Psychological Dysfunction in Asthma

Ben Ainsworth, 21.3.17

Developing and evaluating non-pharmacological treatments for patients with asthma

NIHR Postdoctoral Translational Fellowship
(NIHR School of Primary Care)

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Introduction

- What is cognitive psychology and why does it matter for asthma?
- What is the scope for non-pharmacological interventions to improve asthma outcomes?
- What research is ongoing in Southampton?

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What is cognitive psychology?

- ‘Maladaptive’ thought processes that contribute to etiology & maintenance of diseases
 - For example, people who are depressed are more likely to assume neutral stimuli as negative
 - This then leads to increasingly negative interactions
- Designing methods to unpick and model these processes
- Models are used to inform treatments such as cognitive-behavioural therapy

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An example of a cognitive task

- The ‘dot-probe’ task measures a bias to threat
- An arrow is hidden behind one of two words – (Threat vs. Neutral)
- People who show a threat-bias have quicker RTs when the arrow is hidden behind Threat words (‘hypervigilance to threat’)

BLOOD
→
BREAD

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Why does this matter in asthma? (1/4)

- There is a disconnect between patients’ disease, and their subjective symptoms
- Some patients have greatly impaired breathing (but don’t care) while others have relatively mild disease (but are really bothered by it)
- Is this because of cognitive biases?

(Rimington, Thorax 2003; Lavoie, Respir Med 2005)

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Why does this matter in asthma? (2/4)

- This has implications for patient outcomes –demonstrated experimentally using a modified histamine challenge.

60 patients in histamine challenge (HCT) rated their symptoms

→

3 month follow up of quality of life (AQLQ) and asthma control (ACT)

Janssens et al, J Asthma, 2012

- Subjective ratings predicted quality of life and asthma control whereas baseline measures of lung function did not.
- Clearly there is something important going on!

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Why does this matter in asthma? (3/4)

- Collaborators in Oxford (Prof Kyle Pattinson) have conducted program of work exploring neurocognitive function during experience of breathlessness.
- Activity in periaqueductal gray (PAG) is associated with induced breathlessness in healthy volunteers.
- Connectivity between PAG and amygdala is associated with anxiety
- Now investigating whether symptom discordance is associated with increased network activity

Why does this matter in asthma? (4/4)

- Importantly, this has implications for patient outcomes
 - Asthma control and asthma quality of life are worse if there is a psychological comorbidity, independent of cofounders
 - Increased healthcare utilization & use of rescue medication
 - Increased hospitalization
 - Increased mortality
- Need identified in '**Addressing unmet needs in understanding Asthma Mechanisms**'

Part 2

- What is cognitive psychology and why does it matter for asthma?
- **What is the scope for non-pharmacological interventions to improve asthma outcomes?**
- What research is ongoing in Southampton?

Psychological/non-pharmacological interventions for asthma

- What types of treatment might modify health, cognition & behaviour?
 - CBT
 - Breathing Retraining
 - Mindfulness
 - Mood-training
 - Biofeedback techniques
 - Relaxation
- Can these be delivered digitally, and who will benefit from them?

Psychological/non-pharmacological interventions for asthma

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REVIEW

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Nonpharmacological interventions aimed at modifying health and behavioural outcomes for adults with asthma: a critical review

J. Yorke¹, S. Fleming², C. Shuldham³, H. Rac⁴ and H.E. Smith⁵

¹Nursing, University of Manchester, Manchester; ²Nursing Research, Royal Brompton and Harefield NHS Foundation Trust, London; ³Nursing and Quality, Royal Brompton and Harefield Foundation Trust, London and ⁴Public Health and Primary Care, University of Brighton, Brighton, UK

- Systematic review of 23 studies updated Cochrane review (Yorke, 2007)
- CBT, relaxation & mindfulness have a consistent positive effect on quality of life & psychological outcomes
- Trial heterogeneity means limited applications

Aim to stratify patients to maximize benefit from psychological interventions

- In order to do this, need to determine mechanisms through which psychological interventions can effect benefit.
- Several projects at Southampton exploring this in different ways.
 - 'My Breathing Matters': a tailored self-management intervention that aims to improve asthma quality of life
 - 'Mindfulness for Difficult Asthma' (MIDAS): group mindfulness treatment for patients in Wessex Severe Asthma Cohort
 - 'Mobile Mindfulness for Asthma' (MOMA): online mindfulness treatment for patients in Primary Care
- The effects of bronchial challenge on cognition (BROCOG)
- Psychological analyses in asthma study cohorts

What is My Breathing Matters?

- An online self-management programme to improve a variety of asthma-related outcomes, primarily quality of life.
- Designed by Lifeguide Team at University of Southampton using 'Person-based Approach' (50+ patient interviews)
- A feasibility study comparing 40 patients using MBM vs. 40 usual care patients, over 1 year.

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What is My Breathing Matters?

- Patients can choose pharmacological or non-pharmacological arm

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What is My Breathing Matters?

- Patients can choose pharmacological or non-pharmacological arm

Use behaviour change techniques to:

- Increase adherence with 4-week challenge
- Improve medicine technique
- Attend asthma review
- Make asthma action plan with GP

Vs.

Use behaviour change techniques to:

- Practice Breathing Retraining
- Practice stress-reduction
- Involve family & friends

• Currently being trialled – patients are very much 'one side or the other'

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Mindfulness for Difficult Asthma

What is mindfulness?
Paying attention: on purpose, right now, without judgement.
Related to meditation, sessions focus on 'attending to stimuli' (breath) and accepting without judging.
Has benefited patients with anxiety, depression, chronic pain.

- 18 patients from difficult asthma clinic took part in 4-week group mindfulness intervention
- Pre-post measures of asthma control, AQLQ & cognitive testing to explore mechanisms of impact
- Qualitative investigation of feasibility.

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Mindfulness for Difficult Asthma

- Study sample:
 - High anxiety (HADS_{A,mean} = 9.2)
 - Poor asthma control (ACQ_{mean} = 2.7)
 - Impaired quality of life (AQLQ_{mean} = 4.1)
 - Impaired lung function (FEV₁/FVC%_{pred-mean} = 71.2)
 - High healthcare use (1.5 hospitalizations in last year, 7.5 GP visits)
- Feasibility:
 - Challenging recruitment & retention (8 participants attended intervention sessions, 9 participants attended follow-up appointment)
 - Others were followed up via phone call.

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Mindfulness for Difficult Asthma

- Quantitative findings:
 - Improvements in quality of life (AQLQ pre-post difference: 0.43).
 - Improvement in anxiety (HADS-A pre-post difference: 1.8).
- Qualitative findings:
 - Almost all patients considered it to help 'anxiety that was part of asthma'
 - Many saw a time and a place for non-drug therapies to complement medicine
 - Many viewed it as a strategy that could be used 'when needed'
 - All found it fine to focus on the breath
 - Several independently suggested alternative delivery methods; drop-in sessions, skype, online, 1-1

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Mindfulness for Difficult Asthma

"In regard to general breathlessness I've definitely noticed a difference.... it's allowed me to appreciate what I do have, appreciate what I can do and not push myself overly even when I feel quite well. And equally not to feel rubbish when I can't do stuff."

"Instead of being so tense and angry and everything it's just breathe, feet down. What can you do about it? You can't do anything about it. Take this moment, gather your thoughts, de-stress, relax, get it down until it's done."

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Mobile Mindfulness for Asthma

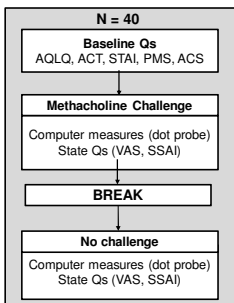
- Building on feasibility findings from MIDAS.
- MOMA is study conducted online in primary care patients
- 120 patients will complete measures of asthma control, quality of life, anxiety and illness perception either side of using the Headspace Mindfulness intervention (80 intervention vs. 40 control)
- Are experiences of digital mindfulness similar to in person? What level of support is needed?
- What psychological mechanisms of change are linked to QoL?
- Is 'normal mindfulness' sufficient or does it need to be tailored to asthma?

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Bronchial Challenge & Cognition



- Generally mild/moderate asthma: 38% male, FEV₁/FVC: 76%, ACQ: 0.83
- All patients had objective 20% drop in FEV₁
- We measured subjective experience of this drop.
- How does this relate to cognitive function?

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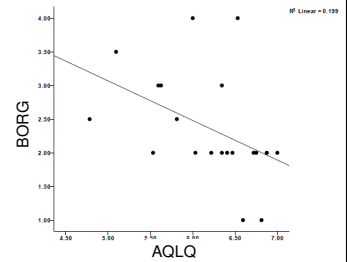
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Bronchial Challenge & Cognition

Preliminary Results (N=24)

- Participants reporting greater subjective breathlessness had worse QoL (r = -.45).
- Breathlessness also associated with more negative affect (r = .49) and higher anxiety (r = .44)



- Next analyses will look at cognitive responses during vs. not during challenge, and also pre-post mindfulness intervention

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In summary...

- There is certainly scope for non-pharmacological treatments to complement pharmacological treatments
 - Both in terms of improving treatment effectiveness (adherence etc) but also to address psychological aspects of disease.
- Tight experimental research can determine the mechanisms by which these treatments can help - and potentially predict which patients will benefit.

Thank you.

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