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| **Understanding breathlessness in asthma**  |
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| 1Centre for Research Excellence in Treatable Traits, College of Health, Medicine and Wellbeing, University of Newcastle, New Lambton Heights, Australia2Asthma and Breathing Program, Hunter Medical Research Institute, New Lambton 3 3Department of Respiratory and Sleep Medicine, John Hunter Hospital, New Lambton Heights, Australia4Speech Pathology Department, John Hunter Hospital, New Lambton Heights, Australia5School of Psychological Sciences, University of Newcastle, Callaghan, Australia**Key words:** dyspnoea,severe asthma,activity intolerance, treatable traits |
| **Introduction/Aim:** Breathlessness is a cardinal symptom of asthma, and is particularly problematic and disabling for people with severe disease. To effectively manage breathlessness in asthma, an improved understanding of underlying mechanisms is needed. This study aimed to determine: 1. The prevalence of breathlessness in people with severe compared with mild-to-moderate asthma; and
2. Factors associated with breathlessness in people with asthma.

**Methods:** This was a cross-sectional study of people with mild-to-severe asthma who attended two in-person visits completing a multidimensional assessment. Outcomes from this multidimensional assessment were compared between severe and mild-to-moderate asthma, and breathless and not breathless (modified Medical Research Council [mMRC] dyspnoea score ≥2 versus 0-1), using statistical tests as appropriate for their distributions. A directed acyclic graph informed the inclusion of variables in a multivariate logistic regression model to predict breathlessness. Statistical significance was considered at p<0.05. **Results:** 144 participants were included, of which, 74 (51%) had mild-to-moderate asthma and 70 (49%) severe asthma. Participants were predominantly female (n=103, 72%) with median (IQR) age of 63.4 (50.5-69.5) years and body mass index of 31.3 (26.2-36.0) kg/m2. The proportion of people reporting mMRC ≥2 was significantly higher in those with severe (n=37, 53%) compared with mild-to-moderate (n=21, 31%) asthma (p=0.013). mMRC (severe versus mild-to-moderate asthma, median [IQR]: 2 [1-3] versus 1 [1-2], p=0.007)and Dyspnoea-12 Total (8.00 [4.75-17.0] versus 5.00 [2.00-11.0], p=0.037) scores also significantly differed between groups. Significant predictors of breathlessness were: depression (Hospital Anxiety and Depression scale), hyperventilation (Nijmegen score), and exercise capacity (6-minute walk distance) (AUC=0.958). **Conclusion:** Over half of people with severe asthma experience clinically relevant breathlessness. Depression, hyperventilation symptoms, and exercise capacity were predictors of breathlessness in people with asthma. Targeting these treatable traits may help to relieve the burden of breathlessness, which is of high priority to this patient population. **Grant Support:** NHMRC Centre of Research Excellence in Treatable Traits**Declaration of Interest Statement:** The authors have no conflicts of interest to declare in relation to the submitted work |