Breathlessness, Anxiety, Depression, and Function - The BAD-F Study: A Cross-Sectional and Population Prevalence Study in Adults

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David Currow, Sungwon Chang, Helen Reddel, Slavica Kochovska,

Diana Ferreira, Irina Kinchin, Miriam Johnson, Magnus Ekström

Dr Slavica Kochovska
Postdoctoral Research Fellow
IMPACCT – Improving Palliative, Aged and Chronic Care through Clinical Research and Translation, University of Technology Sydney

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Original Article

Breathlessness, Anxiety, Depression, and Function—The BAD-F Study: A Cross-Sectional and Population Prevalence Study in Adults

David C. Currow, BMed, MPH, PhD, FRACP, FAHMS, Sungwon Chang, PhD, Helen K. Reddel, MBBS, PhD, FRACP, Slavica Kochovska, PhD, MA(Hons), BA(Hons), Diana Ferreira, MD, MPC, Irina Kinchin, MSc, PhD, Miriam Johnson, MBChB(Hons), MD, MRCP, FRCP, and Magnus Ekström, MD, PhD

IMPACCT (D.C.C., S.C., S.K., I.K.), Faculty of Health, University of Technology Sydney, Ultimo, New South Wales, Australia; Wolfson Palliative Care Research Centre (D.C.C., M.J.), University of Hull, Hull, England; Australian National Palliative Clinical Studies Collaborative (D.C.C., S.C., S.K.), Faculty of Health, University of Technology Sydney, Ultimo, New South Wales; Woolcock Institute of Medical Research (H.K.R.), University of Sydney, New South Wales; Flinders University (D.F.), Flinders Drive, Bedford Park, South Australia; Division of Respiratory Medicine & Allergology (M.E.), Department of Clinical Sciences, Lund University, Lund, Sweden

Background

- Chronic breathlessness is a prevalent, disabling syndrome, affecting more than 2.6% of the population, on a daily basis and often for years.
  - Associated with poorer physical and mental quality of life, increased health service utilisation, and is strongly correlated with depressive symptoms and poorer survival.
- Anxiety and depression are highly prevalent, under-recognised, and under-treated; often co-exist
- The relationship between anxiety, depression, or both and breathlessness in the general population is poorly delineated.
  - Many chronic conditions are associated with psychological comorbidity that limit care options, worsen clinical outcomes,leading to increased need for help in activities of daily living
  - Most studies are in relation to diagnostic groups rather than symptoms
  - Most studies are of people within the health care system

Aim

- To evaluate the associations between chronic breathlessness, anxiety, depression, or both and levels of function across a general population.

Null hypotheses: there would be relationship between neither community rates of breathlessness and anxiety, depression, both nor functional status.

Methods

- A population-based, cross-sectional study
- Quota-governed online survey distributed to a market research company's database of 30,000 registrants to generate a:
  - pre-planned sample size of 3,000 adults (18 years or older) representative of Australia's 2016 Census population by sex, age, state/territory of residence and rurality
- Key measures: anxiety and depression; chronic breathlessness; functional status

Methods – Key Measures

- Anxiety and depression were assessed using the Four-Item Patient Health Questionnaire (PHQ-4)
  - Consists of Two-Item Generalized Anxiety Disorder [GAD-2] for anxiety, and Two-Item Patient Health Questionnaire [PHQ-2] for depression
  - Scores for each question range from 0 to 3 giving a potential total of 0-12 for PHQ-4
  - Higher scores reflect higher levels of anxiety or depression
  - Data were dichotomised at the recommended >3 threshold for each subscale
    - four mutually exclusive groups: no anxiety or depression, anxiety only, depression only, and coexisting anxiety/depression.

Methods – Key Measures

- Chronic breathlessness was assessed using the modified Medical Research Council (mMRC) breathlessness scale:
  - 5-point ordinal scale (0-4); higher scores reflect decreasing function due to breathlessness
  - Data were dichotomised at mMRC ≥2
- Functional status was assessed using the Australia-modified Karnofsky Performance Scale (AKPS)
  - 11-point ordinal scale (0-100); scores ≤60 indicate an increasing need for help from others in activities of daily living
  - Data were dichotomised at 100-70 vs ≤60

Methods – Statistical Analyses

- Respondents' characteristics were compared between anxiety/depression status using a chi-square test for categorical variables and analysis of variance or Kruskal-Wallis test for continuous variables.
- Multinomial logistic regression assessed the predictors of group membership for the anxiety/depression status.
- Odds ratios, adjusted odds ratio, and 95% CI for the likelihood of being breathless were examined using multiple logistic regression.
- No data were imputed.

Results

- 3,000 eligible adults responded
- 24 had missing scores for both anxiety and depression
- 2,977 people were analysed

Characteristics of study population:

- Female 51.2%
- Median age 45.0 (IQR 72.0)
- 30.7% living in NSW

Results

Prevalence:

- Breathlessness (mMRC ≥ 2) 2.4% (n = 72)
- Anxiety 6.0% (n = 179)
- Depression 2.7% (n = 80)
- Coexisting anxiety/depression 6.1% (n = 181)
- Decreased functional status (AKPS ≤ 60) 1.6% (n = 49)

Results

- Age, experiencing breathlessness, duration of breathlessness, and functionality were significantly associated with psychological morbidity.
- Age perspective: highest median was in the no anxiety or depression group
- Gender perspective: a higher proportion of females was in the anxiety-only group
- Decreased functionality: highest proportion was in the coexisting anxiety/depression group
- Breathlessness: highest proportions were in the coexisting anxiety/depression and depression-only groups

Results

Coexisting anxiety/depression group

- Associated with poorest function (11.6%)
  - The relationship between poorer functional status and coexisting anxiety/depression was significant (odds ratio 0.90; 95% CI 0.89,0.92)
- Highest proportion of people with breathlessness (10.6%)

Depression-only group

- Highest proportion of people with breathlessness (8.8%)
  - Odds of breathlessness estimated to be 3.0 times higher for this group (adjusted odds ratio 3.0; 95% CI 1.2, 7.8)

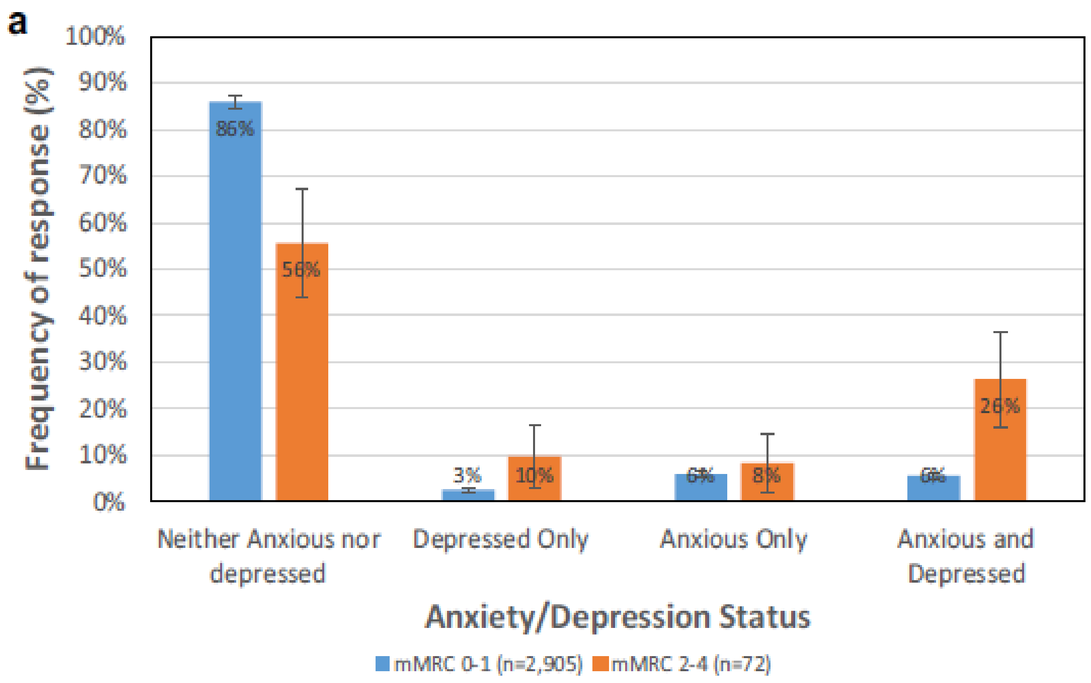
Results

Multinomial regression: Depression, anxiety, and coexisting anxiety/depression were predicted by younger age, longer duration of breathlessness, and poorer functional status

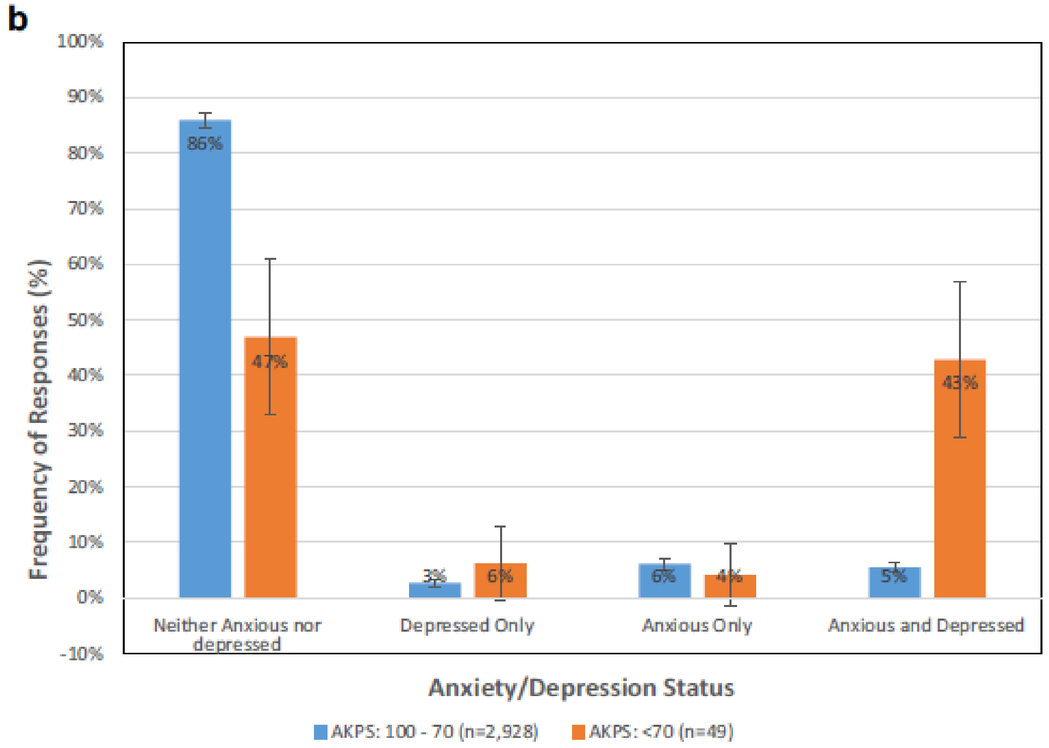
	Depression[#] ***only*** vs. Neither	Anxious[##] ***only*** vs. Neither	Depressed[#] ***AND*** anxious[##] vs. Neither
	OR (95% CI)		
Age*	**0.97 (0.95, 0.98)**	**0.97 (0.96, 0.98)**	**0.96 (0.95, 0.97)**
Male	1.06 (0.68, 1.66)	0.55 (0.40, 0.76)	0.84 (0.61, 1.15)
Breathlessness (mMRC)	**5.33 (2.26, 13.59)**	2.12 (0.87, 5.15)	**5.05 (2.67, 9.54)**
AKPS: ≤60**	**3.77 (1.06, 13.44)**	1.38 (0.31, 6.01)	**13.56 (6.87, 26.76)**

*as a continuous variable; **AKPS: Australia-modified Karnofsky Performance functional status; mMRC: modified Medical Research Council breathlessness scale; [#]Patient Health Questionnaire-2 question (PHQ-2); Generalised Anxiety Disorder-2 question (GAD-2). (Together PHQ-2 and GAD-2 are the PHQ-4).

Relationship between *chronic breathlessness*, anxiety, and depression

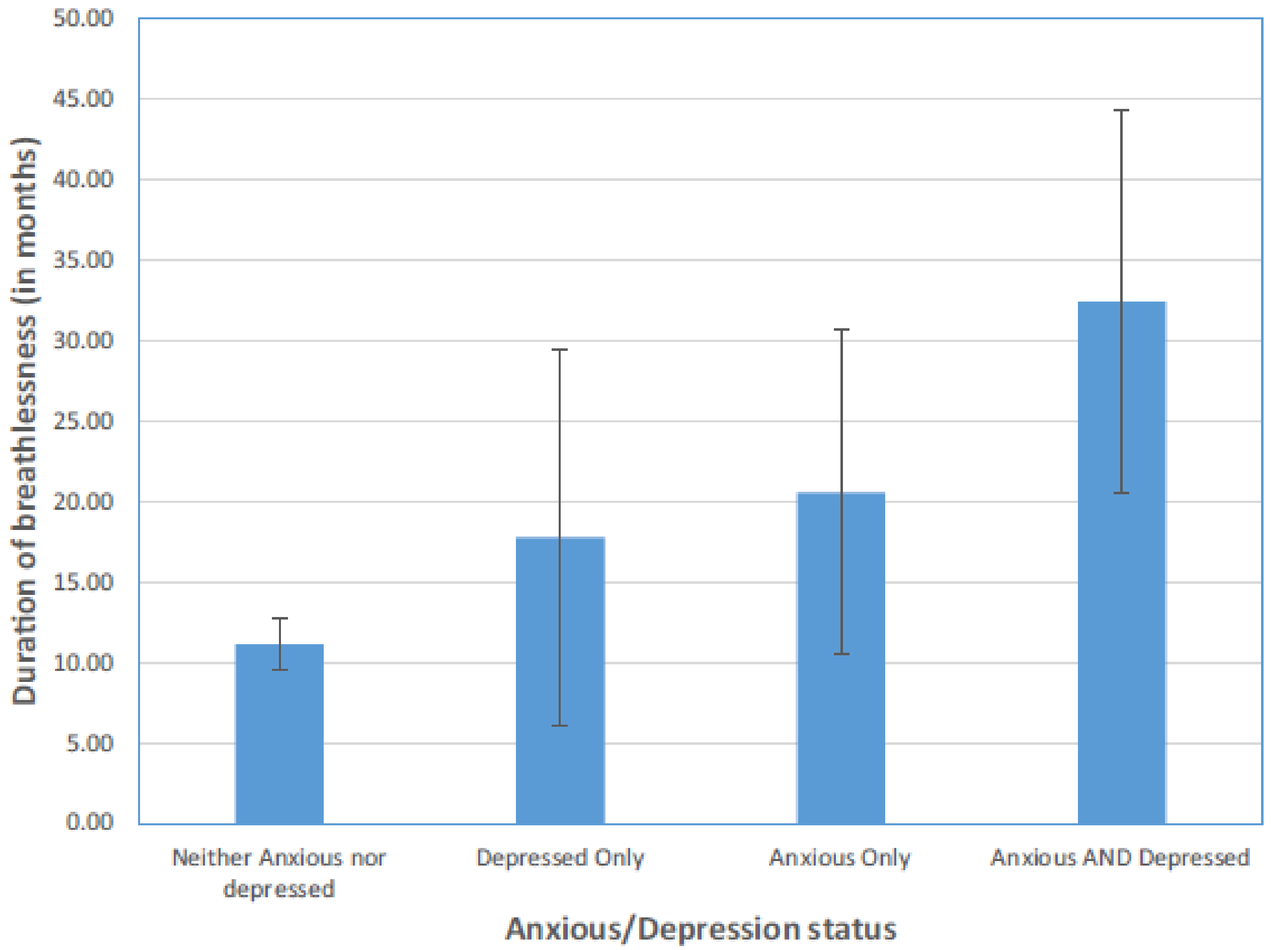


Relationship between *functional status*, anxiety, and depression



Population representative of the national population by age, sex, state/territory of residence, and metropolitan/nonmetropolitan (n = 2977).

Duration of *breathlessness* in months according to *anxiety/depression* status



Mean duration of breathlessness in months according to anxiety/depression status.

Key Findings

- Clinically important breathlessness (mMRC ≥ 2) was strongly associated with clinically relevant levels of psychological morbidity.
- Very strong association between poorer functional status and psychological morbidity (when controlled for chronic breathlessness).
- An association between duration of breathlessness and psychological morbidity.
- A close relationship between coexisting anxiety/depression and functional decline.
  - Functional decline is a common pathway in chronic conditions
    - Leads to decreasing autonomy, loss of independence, increasing social isolation, and deconditioning, which can further worsen breathlessness
    - These factors may contribute to aggravating anxiety, depression, or both
    - Is psychological comorbidity a consequence of breathlessness itself or the functional/social loses imposed by breathlessness?

Strengths and Limitations

Strengths

- Community-based survey – results are more likely to reflect the real prevalence of chronic breathlessness, functional status, psychological morbidity, and their relationship in the general population
- Web-based survey – response rates with internet surveys are now higher than postal or telephone surveys or face-to-face interviews
- The topic of the survey was not revealed before respondents engaged

Strengths and Limitations

Limitations

- The online delivery of the survey may have introduced bias toward participants who are more technologically adept, limiting the generalisability to the population as a whole.
- Data on potential confounders associated with chronic breathlessness were unavailable (smoking, heart/lung functions, objective measures of daily activities, socioeconomic status)
- The study relied on self-report of respondents, with no objective verification

Implications for Clinical Research and Practice

- There is a need to screen for anxiety and depression in people with deteriorating function and in moderate-to-severe chronic breathlessness.
- Could successful symptomatic treatment of the person’s chronic breathlessness predictably reduce anxiety, depression, or both?
- Could successful treatment of anxiety states or clinical depression in those with chronic breathlessness improve symptoms?

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slavica.kochovska@uts.edu.au