The validity and reliability of the Breathing Vigilance Questionnaire (Breathe-VQ)

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Introduction and Objectives Dysfunctional breathing (DB) is common among people with and without primary respiratory pathology. While anxiety is known to contribute to DB, the underpinning mechanisms are unclear. One likely explanation is that anxiety induces excessive conscious monitoring of breathing, which disrupts 'automatic' breathing mechanics. We aimed to validate a new patient-reported outcome measure that allows quantification of such breathing-related 'hypervigilance': the Breathing Vigilance Questionnaire (Breathe-VQ).

Methods Three-hundred-and-forty healthy adults (Mean age =27.3 years, range: 18–71; 161 men) were recruited online. The initial Breathe-VQ (11 items, 1–5 Likert scale) was adapted from the Pain Vigilance and Awareness Scale based on feedback from people with and without DB, and expert clinicians and researchers. At baseline all participants completed the Breathe-VQ, background questions, Nijmegen Questionnaire (NQ), Movement Specific Reinvestment Scale and State-Trait Anxiety Inventory (form 2). To assess test-retest reliability, two weeks later 83 people completed the Breathe-VQ again. Validation involved screening of individual items' behaviour and factor analyses, after which we estimated (retest-)reliability, measurement error, and concurrent/discriminant validity of the finalised Breathe-VQ scale.

Results We removed five items based on item-level and factor analyses. The final six-item Breathe-VQ questionnaire (score range: 6–30) showed excellent internal consistency (ICC=.810) and test-retest reliability (alpha=.892). Minimal detectable change was 6.5 on an individual level, and there were no floor or ceiling effects. Concurrent validity was excellent with significant moderate correlations with measures of general trait anxiety(r's=.35-.46). Participants at high-risk of having DB (NQ>23; N=76) had significantly higher total scores on the Breathe-VQ (M=19.1, SD=5.4) than low-risk peers (N=225; M=13.8, SD=5.0) p<.001. Further, within this 'high-risk' group, Breathe-VQ scores were significantly associated with NQ-scores. Figure 1 shows the final validated Breathe-VQ.

Breathing Vigilance Questionnaire (Breathe-VQ)

Please read the sentences below and choose a number between 1 (never) and 5 (always) that best describes how you typically feel in relation to your breathing.

	Never		Sometimes		Always
1. I closely monitor how difficult my breathing feels	1	2	3	4	5
2. I become alarmed when I experience breathlessness or tightness in my chest	1	2	3	4	5
3. I am highly aware of small changes in how my breathing feels	1	2	3	4	5
4. I feel as if I am more aware of my breathing than other people	1	2	3	4	5
5. When something happens that affects my breathing, I am anxious to work out how breathless I am	1	2	3	4	5
6. I worry about fluctuations in my breathing	1	2	3	4	5

NB: Item scores are summed to yield a total score ranging from 6-30 points, with higher scores suggesting greater breathing vigilance.

Conclusion The Breathe-VQ is a valid and reliable tool to measure vigilance of breathing. Our data suggest that breathing vigilance may be a contributing factor in DB, and could represent a therapeutic target. Further research is now warranted using the Breathe-VQ in clinical populations of individuals with DB, chronic respiratory disease and COVID-19. Further research could assess the effects of breathing re-training, pulmonary rehabilitation and arts-in-health interventions on vigilance of breathing.