



## LETTER TO THE EDITOR

## The Brompton breathing pattern assessment tool (BPAT): Portuguese translation and cultural adaptation



Dear editor,

Within the discipline of respiratory medicine, there is a growing recognition of the relevance of breathing pattern disorders.<sup>1,2</sup> Breathing pattern disorder, or dysfunctional breathing, is commonly characterized by an abnormal breathing pattern resulting in respiratory and non-respiratory symptoms, which may occur secondary to diseases or in its absence. The underlying mechanisms can be physiological (e.g. lung disease), but also psychological (e.g. anxiety, stress and pain) and biomechanical (e.g. overuse-related musculoskeletal injuries).<sup>3</sup> Assessment of the breathing pattern is thus an important aspect to include in the clinical examination.

Breathing pattern assessment typically involves observation of the individual's breathing and manual assessment of thoracic movements.<sup>4</sup> These techniques are simple and inexpensive to use, but often subjective and qualitative in nature. This subjectivity can limit reporting and interpretability in electronic health records, mainly due to the different terminologies used by healthcare professionals to describe the findings. Therefore, valid and objective tools that provide a systematic and quantitative approach to evaluate the impact of a breathing pattern disorder and monitor clinical progress are required.

The Brompton Breathing Pattern Assessment Tool (BPAT) was developed as a promising tool to objectively assess the breathing pattern,<sup>5</sup> and its real-world application and psychometric properties have been studied in people with respiratory conditions, such as asthma and long-COVID.<sup>6,7</sup> This tool could be useful in clinical practice in Portugal, but a valid translation is lacking. We aimed to translate, cross-culturally adapt and examine the content validity of the Portuguese version of the Brompton BPAT.

The Brompton BPAT includes 7 items to assess the breathing pattern, namely (1) abdominal or upper chest movement; (2) inspiratory flow; (3) expiratory flow; (4) channel of inspiration and expiration; (5) air hunger; (6) respiratory rate; (7) rhythm. Answers are given on a scale of 0–2, except for item (7) where the answer is given as 0 or 2. The tool is administered by a healthcare professional who observes and scores the patient's breathing pattern at rest for one minute. The total score is calculated from the sum of all items, and can range from 0 to 14 points, with higher scores indicating an abnormal breathing

pattern. A cut-off  $\geq 4$  was recently suggested to indicate a breathing pattern disorder in people with asthma.<sup>5</sup>

Translation and cultural adaptation were carried out according to international recommendations,<sup>8,9</sup> including initial translation, evaluation of this translation and cultural adaptation by a panel of experts, and back translation. Authorization for the translation and validation process was first obtained from the original authors. The translation was performed independently by 2 native Portuguese researchers/respiratory physiotherapists fluent in English (R.V. and C.J.). These translations were evaluated by an expert panel in respiratory medicine/questionnaires validation, including the 2 translators, 1 pulmonologist (C.R.) and 2 respiratory physiotherapists (S.S. and V.A.). Disagreements about the translation were discussed by the panel in an online meeting. The expert panel suggested the inclusion of a specific instruction for the assessor to ensure that the evaluated subject is unaware that they are being observed, thus reducing the possibility of conscious changes in the breathing pattern. A synthesis of this discussion produced one common BPAT preliminary version.

A total of 10 healthcare professionals (2 pulmonologists, 5 respiratory physiotherapists, 2 musculoskeletal physiotherapists and 1 neurological physiotherapist) were invited to examine the content validity of the BPAT. After sending the BPAT, individual meetings (in person or online) following semi-structured guidelines were conducted. Based on the feedback gathered, the content of the BPAT appeared to show a valid representation of breathing pattern characteristics and all agreed that the tool would be a useful addition to clinical practice.

The expert panel met a second time to analyze all the previous contributions and to produce a final Portuguese version of the BPAT, which is available upon request. This version was back translated by one bilingual researcher with source language (English) and with no prior knowledge of the questionnaire. A copy of the English version was sent to the original authors and was approved without further suggestions.

This study describes the Portuguese translation and cultural adaptation processes of the BPAT, which is now available to be used in routine clinical practice. To the best of our knowledge, there are few validated measurement instruments to assess the breathing pattern, and none validated in European Portuguese. The BPAT tool was chosen to address this important gap as it has been recently developed and has garnered considerable interest in the scientific community.<sup>10</sup> This is due to several advantages, mainly, ease of administration, no need for manual assessment, equipment and/or specialist training.<sup>5</sup>

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These allow the BPAT to be used either face-to-face or remotely using videoconferencing technology, both of which have proven to be reliable.<sup>7</sup> Another reason for choosing this tool is that, from the expert healthcare professional perspective, it includes the assessment of relevant components of the breathing pattern disorders, namely upper/lower chest movement, respiratory rate, signs of air hunger and nose/mouth breathing.<sup>11</sup> The BPAT also has the potential to play a crucial role in identifying core features of breathing pattern disorders, guiding interventions, and evaluating their effects in the future. The provision of the Portuguese BPAT also constitutes the first step towards future studies on the determination of the psychometric properties (i.e. validity, reliability and responsiveness) and interpretability of this tool. It is suggested for use with people with respiratory conditions, but it can also be transferred to other appropriate populations, such as people with cardiac and metabolic conditions, among others.

The Portuguese BPAT version is now available to improve the identification of breathing pattern disorders in routine clinical practice. The healthcare professionals considered its content valid and its usefulness promising. Further research is needed to examine its real-world use and measurement properties in several populations.

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## Declaration of competing interest

None.

## CRedit authorship contribution statement

**R. Vilarinho:** Conceptualization, Data curation, Formal analysis, Writing – review & editing. **C. Ribeiro:** Data curation, Formal analysis, Writing – review & editing. **V. Abreu:** Data curation, Formal analysis, Writing – review & editing. **S. Souto-Miranda:** Data curation, Formal analysis, Writing – review & editing. **F. Silva:** Data curation, Formal analysis, Writing – review & editing. **C. Jácome:** Conceptualization, Data curation, Formal analysis, Writing – review & editing.

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