

Questionnaires and manual methods for assessing breathing dysfunction

Rosalba Courtney, Jan van Dixhoorn

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INTRODUCTION

The assessment of breathing dysfunction includes the evaluation of the patient's symptoms using questionnaires, and of their breathing pattern through the use of instrumentation, or by direct observation and palpation.

Questionnaires or breathing pattern evaluation are often used as the sole basis for assigning to the patient the diagnostic label of dysfunctional breathing. This may not be an appropriate use of these tools. Dysfunctional breathing is not precisely defined and cannot be established on the basis of a single measurement. Subjective symptoms of breathing discomfort may have relatively little correlation with objective signs of breathing dysfunction. Breathing is a dynamic system which is under the influence of many factors. These are of a physical and pathological nature, as well as from psychic and emotional origin and also may be part of social and behavioural patterns. Respiratory disturbances or breathing pattern disorders can arise from a host of causes. Information gleaned from questionnaires and breathing pattern assessments need to be interpreted with attention to the particular context in which they appear, in light of other clinical findings and with an attempt to understand other possible causes of the patient's symptoms and breathing pattern abnormalities.

Questionnaires and assessment of breathing patterns, however, do provide a useful place from which to start to understand the patient, and when used together with other assessment tools, can inform the practitioner about the functionality of a patient's breathing. This chapter will discuss two questionnaires, the Nijmegen Questionnaire (NQ) and the Self-Evaluation of Breathing Questionnaire

(SEBQ), located in the appendices to this chapter, as well as a manual procedure to assess the global quality of respiratory movement called the Manual Assessment of Respiratory Motion (MARM). Alternative/additional evaluation approaches are to be found in the other chapters in Section 6.

The Nijmegen Questionnaire was originally devised to evaluate the symptoms of hyperventilation syndrome and is the questionnaire most commonly used to identify and evaluate dysfunctional breathing. In recent years this questionnaire has also been used to evaluate medically unexplained (respiratory) symptoms whose origins are likely to be rooted in psychic and emotional stress and are variably connected to hypocapnia (Katsamanis et al 2011, Gevirtz 2007, Han et al, 2004). However, it has always been clear that there is a large overlap with symptoms of stress/anxiety. NQ may therefore be helpful to identify the presence of symptoms mediated by general distress as well as symptoms of respiratory distress.

The SEBQ can be a useful complement to the NQ in evaluating breathing dysfunction. It was designed to evaluate a broader range of breathing symptoms than the NQ. It can be useful for monitoring both the extent of respiratory discomfort and the distinct qualities of these uncomfortable breathing sensations.

The efficiency with which the mechanical act of breathing is performed is an important aspect of breathing functionality. Inefficient patterns of breathing can contribute to dyspnoea, musculoskeletal dysfunction and impact on the efficiency of circulatory and homeostatic processes. The MARM is a manual procedure that can be used to quantify the distribution of breathing movement. It has two aspects: the area or extent of breathing movement and the location of breathing on a vertical axis (upper-thoracic, costo-abdominal, abdominal).

Efficient breathing is dependent on the coordination and balanced use of many breathing muscles. The efficiency of particular muscular coordination patterns is dependent on a person's posture, activity level and disease. Breathing patterns considered dysfunctional in some situations may be appropriate in others. During increased activity or at times of increased respiratory drive it is considered normal for the breathing to become more thoracic-dominant, and for there to be increased recruitment of the accessory muscles of respiration (De Troyer & Estenne 1988). In patients with restrictive lung disease or in the advanced stages of chronic obstructive pulmonary disease a thoracic upper chest breathing pattern may be the best adaptation to severe lung pathology (Cahalin et al 2002). Efficient breathing also involves appropriate timing and volume adjustments that are sensitive and responsive to changes in the person's internal and external environment but not excessively chaotic or irregular. Context can be an important factor in differentiating normal from abnormal breathing patterns, i.e. disease, ventilatory drive, states of activity compared with states of rest.

QUESTIONNAIRES

Generally speaking people with breathing dysfunction have more respiratory discomfort than those whose breathing is efficient and functional (Courtney et al 2011a). They may also have complaints in other systems whose function is closely inter-related with breathing such as the cardiovascular or autonomic nervous systems (Wilhelm et al 2001).

The SEBQ focuses on evaluating respiratory symptoms while the NQ evaluates the broader range of symptoms whose presence often accompanies breathing dysfunction.

The Nijmegen Questionnaire (NQ)

(see Appendix 1, at end of this chapter)

Normal and abnormal values

NQ consists of 16 items, to be answered on a five point scale, ranging from 'never', counted as zero, to 'very often', counted as 4. The total score ranges from 0 to 64 (Doom et al 1983). Completion of the questionnaire is quick, and only takes a few minutes. The items were chosen to represent a range of symptoms:

- Stress and arousal (e.g. feeling anxious, tense, having palpitations)
- Presumed consequences of hypocapnia (e.g. dizziness, blurred vision, tingling and stiffness around mouth and in hands)
- Difficulty breathing (e.g. inability to take a deep breath, tightness in the chest).

However, items presumed to result from hypocapnia could be the result of stress and high sympathetic tone as well.

For its practical use, it is of importance to establish a criterion for the presence or absence of dysfunction and abnormal level of complaints. On average, a normal, healthy individual has a sum score of 11 ± 7 , men score somewhat lower than women (Han et al 1997). These data imply that most normal individuals have scores that range from 4 to 18. Note however, that these values have been obtained in Belgium and the UK. In China, by contrast, the normal average value is 5. To define a criterion for dysfunction we used data from over 2000 patients who were referred for treatment with breathing and relaxation therapy, about one quarter of whom were labelled as having 'hyperventilation complaints' (Dixhoorn 2012). Average NQ value of the latter group was 29.5. When taking these patients as the reference for those who most probably would have breathing dysfunction it appears that a value of 20 or higher differentiates them from normal. So, a value of $NQ > 19$ denotes the presence of (respiratory) distress and dysfunction. The higher the score, the more distress is present. Values below 20 are considered within the normal and functional domain.

