

# Evaluation of Dyspnea in the Elderly

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## KEYWORDS

- Demand to breathe • Ability to breathe • Dyspnea domains and descriptors
- Prevalence of dyspnea • Pursed-lips breathing • Exercise training
- Inspiratory muscle training • Acupuncture

## KEY POINTS

- Dyspnea is due to an imbalance between the *demand to breathe* and the *ability to breathe*.
- The 3 domains of dyspnea are sensory (intensity and qualities), affective (unpleasantness), and impact/burden with activities of daily living.
- Approximately 30% of those 65 years or older report breathing discomfort with walking on a level surface or up an incline.
- The 5 major etiologies for chronic dyspnea in the elderly include anemia, cardiovascular disease, deconditioning, psychological disorders, and respiratory diseases.
- Initial treatments to relieve breathing discomfort should be directed toward improving the pathophysiology of the underlying disease.

## WHAT IS DYSPNEA?

Breathing is normally an unconscious activity. Groups of neurons in the brainstem provide automatic command that control the cyclic contraction and relaxation of the respiratory muscles. Any perturbation or dysfunction in this process can lead to the experience of breathing difficulty. Words describing discomfort associated with breathing date to circa 3300 BC, being found in the hieroglyphics of Mesopotamia. Certainly, the literal meaning, disordered (-dys) breathing (-pnea), does not capture the sensory experience of the individual. Those who experience breathing discomfort often find it hard to describe “what it feels like.” Commonly used phrases are, “I am short of breath” or “I feel like I can’t get enough air.”

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In medical practice, most health care providers focus on how dyspnea affects an individual's ability to perform daily and recreational activities (impact or burden domain).

Various guidelines and strategies emphasize assessing dyspnea related to daily activities to categorize individual patients.<sup>1-3</sup> It is important to recognize that breathing difficulty is a strong predictor of mortality in the elderly who have no known cardiorepiratory disease,<sup>4</sup> in those with chronic obstructive pulmonary disease (COPD),<sup>5</sup> and in individuals admitted to Chest Pain Units for suspected acute coronary syndrome.<sup>6</sup>

In a 2012 update, the American Thoracic Society reaffirmed the following definition of dyspnea<sup>7</sup>:

*A subjective experience of breathing discomfort that consists of qualitatively distinct sensations that vary in intensity.*

It is a warning signal that the usual unconscious awareness of breathing has been altered. The update recommended that dyspnea be evaluated across 3 different domains<sup>7</sup>:

1. Sensory: intensity and qualities
2. Affective: unpleasantness or distress
3. Impact or burden: on activities of daily living

The objective of this article was to provide an update on the evaluation of chronic dyspnea in elderly individuals.<sup>8-10</sup> *Chronic* means that the symptom has been present for at least 1 month.<sup>11</sup> Specific topics include mechanisms of dyspnea, descriptors of breathing discomfort, unique features of dyspnea in the elderly, a diagnostic approach to assess an elderly patient with breathlessness, and treatment options to relieve dyspnea.

## MECHANISMS OF DYSPNEA

A neurobiological model is often used to describe the perception of dyspnea.<sup>12</sup> **Fig. 1** shows a simplified model that depicts afferent impulses transmitting information from activated sensory receptors in the respiratory system to the central nervous system (CNS) and efferent impulses that travel from the CNS to the muscles of respiration. An imbalance between the *demand to breathe* and the *ability to breathe* is a plausible explanation that explains the experience of breathing discomfort. This has been called "neuromechanical dissociation."<sup>7</sup>

### **Sensory Receptors**

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A variety of stimuli activate different sensory receptors that transmit afferent information to the brain. The major stimuli and associated sensory receptors are listed in **Table 1**.<sup>12</sup> Hypoxemia and hypercapnia activate chemoreceptors, whereas multiple stimuli affect mechanoreceptors in the lung and respiratory muscles/chest wall.

### **Afferent Impulses**

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Afferent impulses from sensory receptors transmit information to brainstem respiratory centers that automatically adjust breathing to correct hypoxemia, hypercapnia, and acid-base abnormalities, and maintain appropriate mechanical status of the respiratory system. If ventilatory demand is increased (eg, physical exertion) or if a mechanical load is imposed (eg, bronchoconstriction or lung

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