The BODE Index

Description

The BODE is a multidimensional index designed to assess clinical risk in people with chronic obstructive pulmonary disease (COPD) (Celli et al, 2004). It combines four important variables into a single score: (B) body mass index; (O) airflow obstruction measured by the forced expiratory volume in one second (FEV1); (D) dyspnoea measured by the modified Medical Research Council (MRC) scale; and (E) exercise capacity measured by the 6-minute walk distance (6MWD). Each component is graded and a score out of 10 is obtained, with higher scores indicating greater risk. The BODE index reflects the impact of both pulmonary and extrapulmonary factors on prognosis and survival in COPD (Celli et al 2008).

Assessing prognosis and clinical risk: The risk of death from respiratory causes increases by more than 60% for each one point increase in BODE index (Celli et al 2004). The BODE index also predicts the number and severity of respiratory exacerbations (Marin et al 2009). Individuals with scores in the fourth quartile (scores 7-10) are four times more likely to be admitted to hospital than those with scores in the first quartile (0 – 2) (Ong et al 2005). The BODE is also strongly associated with patient-centred outcomes. Individuals with scores in the fourth quartile are four times more likely to have depressive symptoms than those in quartiles one and two (Al-shair et al 2009).

Responsiveness: The BODE index detects clinical deterioration and changes occurring as a result of therapy. Scores increase during an acute exacerbation of COPD as a result of worsening FEV1, dyspnoea and 6MWD (Cote 2007). Lung volume reduction surgery improves the BODE index in patients with severe COPD as a result of changes in FEV1 and dyspnoea score (Lederer et al 2007). Pulmonary rehabilitation improves average BODE score by 0.9 points in patients with moderate to severe COPD (Cote et al 2005), reflecting the well-established effects of this treatment on 6MWD and dyspnoea.

Reliability, validity and discrimination: The reliability and validity of the BODE index have not been formally evaluated, however its four components have good clinimetric properties. The index was developed in a cohort recruited from three countries and demonstrated similar predictive qualities in all locations (Celli et al 2004), suggesting it is broadly applicable to patients with COPD. The BODE index discriminates between high and low risk of death more accurately than FEV1 alone (Celli et al 2004).

Threshold for clinically important change: A one unit change in the BODE index has been suggested as clinically significant (Cote et al 2005), based on thresholds for important change in individual component scores. This was confirmed in a large sample of patients with severe airflow obstruction, where a one unit increase in BODE over six months was associated with increased mortality (Martinez et al 2008). This study included highly selected patients participating in a trial of lung volume reduction surgery and it is unclear whether the threshold is equally applicable to a more general population of COPD patients.

Commentary

Chronic obstructive pulmonary disease has systemic manifestations that have an important influence on clinical outcome. The BODE index measures functional limitation, nutritional status and symptoms, in addition to airflow obstruction, and is therefore well placed to assess clinical risk and the integrated response to treatment.

All components of the BODE index are routinely collected during a pulmonary rehabilitation assessment and calculation of the BODE score is quick and easy in this setting. However some components of the BODE, such as the 6MWD, may not be routinely available outside pulmonary rehabilitation programs. All four components must be collected according to established protocols (Celli et al 2004), which includes a requirement for two 6-minute walk tests to be performed at least 30 minutes apart to counter the learning effect. This may make the BODE index difficult to collect at routine clinic visits.

Although the BODE index is responsive to commonly used therapies in advanced COPD, it may not detect changes in individuals with better preserved functional capacity. No improvements in the 6MWD component score are possible for individuals with a 6MWD greater than 350 metres. In our pulmonary rehabilitation program, 54% of participants have a 6MWD of greater than 350 metres at baseline and thus their capacity to improve BODE score is limited. Individual components of the BODE may provide more information regarding the domains in which response to therapy has occurred, particularly in less severely impaired individuals.

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References

The Coping Strategy Questionnaire

Description

**General description:** The coping strategy questionnaire (CSQ), (Rosenstiel & Keefe 1983) in its original version consists of 50 items assessing patient self-rated use of cognitive and behavioural strategies to cope with pain. It comprises six subscales for cognitive strategies (ignoring pain, reinterpretation of pain, diverting attention, coping self-statements, catastrophising, praying/hoping) and two subscales for behavioural strategies (increasing activity levels and increasing pain behaviours). Each coping strategy subscale consists of six items measured with a numerical rating scale ranging from 0 (never do that) to 6 (always do that) indicating how frequently the strategy is used to cope with pain. Each subscale has a maximum score of 36 and a minimum score of 0. An additional two single item questions each with a scoring range of 0–6 are used as effectiveness ratings of control over pain and ability to decrease pain. The CSQ takes approximately 5 minutes to complete.

**Reliability and validity:** In a sample of 61 patients with chronic low back pain (CLBP), Rosenstiel and Keefe (1983) reported the internal consistency for the subscales with Cronbach’s alphas ranging from 0.71 to 0.85, except for the increasing pain behaviour subscale which had an internal consistency of 0.28. However, in a sample of 282 CLBP patients, Jensen and Linton (1993) showed that all 8 subscales of the CSQ Swedish version have an internal consistency ranging from 0.69 to 0.84. Similarly, in patients with lung cancer, the CSQ subscales have shown good internal consistency with Cronbach’s alphas ranging from 0.60 to 0.90 (Wilkie & Keefe 1991). Test-retest reliability for a 1 day interval has been reported to range between 0.68 and 0.91 (Main & Waddell 1991), 0.48–0.71 for a 1 week interval and 0.58–0.84 for a 5 week interval (Jensen & Linton 1993).

**Commentary**

Monitoring coping strategies is of clinical importance as they have been shown to mediate the influence of pain intensity on functional disability and quality of life (Abbott et al 2010) and to influence the adjustment of pain (Rosenstiel & Keefe 1983). The CSQ has been shown to be valid for use in several different patient groups such as osteoarthritis, knee replacement surgery, rheumatoid arthritis, fibromyalgia, low back pain, lumbar spine surgery, and even cancer-related pain.

The CSQ is a useful clinical tool for the screening of coping styles. It provides information for patients and clinicians on the efficacy of coping strategies and those strategies needing addressing to help facilitate pain control and mediate improvement of functional outcomes. Data on the CSQ-R sensitivity of change is lacking. More research using the CSQ-R is needed to improve the questionnaire’s validity as an outcome measure and provide more extensive normative data.

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Support exists for the construct validity of the CSQ in chronic pain populations where significant correlations have been shown with questionnaires measuring depression, anxiety, self-efficacy and physical functioning (Lawson et al 1990, Geisser et al 1994, Schutzman et al 1994, Burckhardt et al 1997).

Studies using factor analysis to investigate the underlying dimensions of the 8 CSQ subscales and 2 effectiveness items have frequently reported a three factor solution consisting of 1) cognitive coping and suppression, 2) behavioural activity, and 3) pain control/rational thinking (Rosenstiel & Keefe 1983, Keefe & Dolan 1986, Lawson 1990, Geisser et al 1994, Burckhardt et al 1997). Using exploratory factor analysis on an individual item level, two studies obtained a five factor solution (Tuttle et al 1991, Schutzman et al 1994). Recognising the small samples used in previous studies, item level exploratory factor analysis was performed on the CSQ from a large sample of 965 patients CLBP revealing a six factor solution similar to the subscales originally derived in the CSQ (Robinson et al 1997).

Riley and Robinson (1997) compared the five and six factor solutions for the CSQ using linear structural equation modelling. From the results, Riley and Robinson (1997) recommended a revision of the coping strategy questionnaire (CSQ-R) retaining 27 items from the original CSQ. This included all six items of the catastrophising subscale, five items from each of the ignoring pain and reinterpretating pain sensations subscales, four items from coping self-statements and diverting attention subscales, and three items related to praying factors. In a recent study on patients with cancer related pain, Utne et al (2009) also showed less factorial variance in the CSQ-R than the original CSQ and recommends the CSQ-R for use in clinical research.

**References**