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Responsiveness and Minimal Important Change of the Pain Self-Efficacy Questionnaire and Short Forms in Patients With Chronic Low Back Pain

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Abstract: The Pain Self-Efficacy Questionnaire (PSEQ) is a valid and reliable patient-reported instrument used to assess pain self-efficacy in patients with chronic low back pain (CLBP). Recently, the 2-item (PSEQ-2) and the 4-item (PSEQ-4) short versions were developed showing satisfactory measurement properties in mixed populations with chronic pain. The aim of this study was to examine responsiveness and minimal important change (MIC) of PSEQ, PSEQ-2, and PSEQ-4 in patients with CLBP. We used a sample of 104 patients undergoing multimodal physical therapy designed to partly change pain self-efficacy beliefs. Responsiveness was assessed by testing 16 a priori formulated hypotheses regarding effect sizes, areas under the curve, and correlations with changes in other instruments measuring other constructs. The MIC was calculated using an external anchor specific for pain self-efficacy and the receiver operator characteristic (ROC) method. The PSEQ and the PSEQ-4 met all hypotheses, whereas the PSEQ-2 met all but 1. The MICs were 5.5 for the PSEQ (9% of the scale range) and 1.5 for PSEQ-2 (13% scale range) and PSEQ-4 (6% scale range). MIC values were different for patients with low or high baseline values for all 3 instruments. The PSEQ and its short versions are adequately responsive instruments in patients with CLBP.

***Perspective:** This study suggests that the PSEQ and its short versions are responsive measures of pain self-efficacy in patients with CLBP, adding to previous literature on their validity and reliability. Considering their similar responsiveness, the 4-item PSEQ could replace the original 10-item version in busy clinical or research settings.*

***Key words:** Chronic low back pain, pain self-efficacy, measurement, short forms.*

Low back pain (LBP) causes more disability globally than any other health condition.[68] The financial costs associated with LBP represent a huge burden to society.[27,37,40] Many patients experiencing an episode of LBP develop persistent and fluctuating moderate pain or severe chronic pain.[19,20,35,65] Different reviews have underlined the role of several psychological factors as obstacles to recovery in patients with LBP.[29,34,54]

Foster et al[25] identified pain self-efficacy to be an independent predictor of poor recovery 6 months after initial consultation for LBP. Pain self-efficacy is usually described as the attitudes and beliefs that people with chronic pain hold to carry out certain daily activities, even in the presence of pain.[51] In patients with chronic LBP (CLBP), pain self-efficacy was found to be significantly associated with pain and disability[23,70] and to be a mediator in the relationship between pain and disability.[9] Considering the relevance of this construct, it is crucial to have a sound measurement instrument able to capture it.

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A systematic review found the 10-item Pain Self-Efficacy Questionnaire (PSEQ) as the most extensively studied tool to measure pain self-efficacy.[44] The PSEQ was developed in inpatients with CLBP and subsequently tested in large samples of heterogeneous patients with chronic pain, showing satisfactory internal consistency and construct validity.[51] This questionnaire has subsequently been translated and validated in numerous languages and populations,[1,3,8,17,24,38,55,60,67] showing satisfactory test-retest reliability[1,3,8,38,55,67] and unidimensionality.[1,3,8,17,24,38,55,60,67] Responsiveness has been the measurement property least investigated for this instrument.

Responsiveness has been defined as "the ability of a measurement instrument to detect change over time in the construct to be measured."[45] It is essential that tools used as outcome measurement instruments display adequate responsiveness.[58] Two longitudinal studies[42,52] recently found the PSEQ to be responsive in patients with chronic pain. Another study[41] assessed the responsiveness of the PSEQ in patients with CLBP but included a small sample and reported only the area under the curve (AUC) as index of responsiveness. Responsiveness can be more comprehensively explored by formulating a priori hypotheses on expected effect sizes and correlations with other instruments.[13,56]

Another relevant aspect of an outcome measurement instrument is its interpretability.[45] A frequently assessed index of interpretability is the minimal important change (MIC), which corresponds to the smallest change in score that patients perceive as important.[12] Maughan and Lewis[41] found an anchor-based MIC of 8.5 for the PSEQ (total score range, 0–60) in a small sample of patients with CLBP, without using an external anchor specific for pain self-efficacy. Considering that responsiveness and MIC of an instrument are population and context specific,[57] and that the PSEQ has been widely used as an outcome measure in patients with CLBP,[28,32,36] it is important to further investigate these aspects in patients with CLBP.

Nicholas et al[52] recently developed a 2-item short form of the PSEQ (PSEQ-2), which showed adequate internal consistency, test-retest reliability, construct validity, and responsiveness in a heterogeneous sample of patients with chronic pain. McWilliams et al[42] assessed another 3 short forms of the PSEQ but found that only a 4-item short form (PSEQ-4) met a priori criteria for satisfactory internal consistency, construct validity, and responsiveness. PSEQ-2 and PSEQ-4 were developed to reduce respondents' and assessors' burden; however, before their use as outcome measurement instruments in patients with CLBP, their responsiveness and MIC should be thoroughly evaluated.

Therefore, the aims of this study were to assess the responsiveness and to calculate the MIC of the PSEQ, PSEQ-2, and PSEQ-4 in patients with CLBP.

Methods

Study Participants and Procedure

Patients for this clinimetric study were recruited between September 2014 and April 2015 in a rehabilitation section of an occupational unit affiliated to the Azienda Ospedaliero Universitaria of Bologna, Policlinico S. Orsola-Malpighi (Bologna, Italy). Patients were screened by a physical therapist with more than 30 years of experience in managing patients with musculoskeletal disorders. Patients were included if they were aged 18 to 75 years, had LBP lasting for at least 3 months, had LBP with or without leg pain, and were able to read and speak fluently in Italian. Patients were not included if they presented a specific cause for their LBP (eg, spinal stenosis, fracture, infection, tumor), central neurologic signs, systemic illnesses (eg, rheumatoid arthritis), or severe psychiatric disorders.

Eligible patients signing the informed consent were asked to complete a booklet including information on the following sociodemographic and clinical characteristics: age, gender, marital status, educational level, smoking status, height, weight, pain duration, presence of leg pain, number of medical visits because of LBP in the last 6 months, medications, comorbidities. The presence of LBP was double checked with 2 questions as proposed by Dionne et al[18] for standardization of LBP studies. These 2 questions were: 1) "In the past 4 weeks, have you had pain in your low back?" and 2) "If yes, was this pain bad enough to limit your usual activities or change your daily routine for more than one day?"[18] The first question was supported by a small diagram illustrating the low back area and patients had to answer "Yes" to both questions to be considered eligible for this study. In the same booklet, a set of self-reported measurement instruments was included (a detailed description is provided in the Assessment Tools section).

Patients subsequently underwent a physical therapy intervention that could include 1 or more of the following therapeutic components: 1) therapeutic exercise, 2) manual therapy, 3) spine anatomy and physiology education, 4) pain neurophysiology education, and 5) cognitive-behavioral education. The intervention was delivered by 4 physical therapists: 3 with more than 30 years of clinical experience and 1 with 2 years of experience in managing patients with musculoskeletal disorders. Each physiotherapist could decide length and components of the intervention for each patient based on his or her clinical experience. The intervention was deliberately not standardized because there is evidence showing that the MIC of an instrument is not influenced by different type of interventions,[22] even when interventions are different.[11] All the physiotherapists had undergone extensive graduate and postgraduate training in how to deliver the treatment components. The cognitive-behavioral component of treatment was included because there is evidence suggesting that the addition of this intervention delivered by physical therapists can significantly improve patients' psychological aspects, such as pain self-efficacy.[36]

The patients completing the intervention were administered a booklet including 2 global perception of change scales (GPCSs) (see Assessment tools section) and all other self-reported instruments included in the initial booklet. Ethical approval for this clinimetric study was obtained from the ethics committee of the Azienda