Pain 117 (2005) 137–144

PAIN

www.elsevier.com/locate/pain

Psychometric properties of the TSK-11: A shortened version of the Tampa Scale for Kinesiophobia

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Received 3 February 2005; received in revised form 17 May 2005; accepted 27 May 2005

Abstract

The Tampa Scale for Kinesiophobia (TSK) is one of the most frequently employed measures for assessing pain-related fear in back pain patients. Despite its widespread use, there is relatively little data to support the psychometric properties of the English version of this scale. This study investigated the psychometric properties of the English version of the TSK in a sample of chronic low back pain patients. Item analysis revealed that four items possessed low item total correlations (4, 8, 12, 16) and four items had response trends that deviated from a pattern of normal distribution (4, 9, 12, 14). Consequently, we tested the psychometric properties of a shorter version of the TSK (TSK-11), having excluded the six psychometrically poor items. The psychometric properties of this measure were compared to those of the original TSK. Both measures demonstrated good internal consistency (TSK: $\alpha = 0.76$; TSK-11: $\alpha = 0.79$), test–retest reliability (TSK: ICC = 0.82, SEM = 3.16; TSK-11: ICC = 0.81, SEM = 2.54), responsiveness (TSK: SRM = −1.19; TSK-11: SRM = −1.11), concurrent validity and predictive validity. In respect of specific cut-off scores, a reduction of at least four points on both measures maximised the likelihood of correctly identifying an important reduction in fear of movement. Overall, the TSK-11 possessed similar psychometric properties to the original TSK and offered the advantage of brevity. Further research is warranted to investigate the utility of the new instrument and the cut-off scores in a wider group of chronic pain patients in different clinical settings.
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Keywords: English; TSK; TSK-11; Fear of movement; Reliability; Validity; Responsiveness

1. Introduction

Back pain patients who exhibit higher levels of pain-related fear report higher levels of pain (Roelofs et al., 2004a; Vlaeyen et al., 1995), greater levels of disability (Crombez et al., 1999; Grotle et al., 2004; McCracken et al., 1996; Waddell et al., 1993; Woby et al., 2004a), and perform less well on physical performance tests (Al Obaidi et al., 2000; Crombez et al., 1998; Geisser et al., 2004) in comparison to those patients who exhibit lower levels of pain-related fear. Moreover, reductions in pain-related fear are related to reductions in disability (Mannion et al., 2001; Woby et al., 2004b). In view of these findings, it is imperative that clinicians and researchers have access to valid and reliable measures of pain-related fear.

The Tampa Scale for Kinesiophobia (TSK; Kori et al., 1990; Miller et al., 1991) has become one of the most frequently employed measures for assessing pain-related fear in back pain patients. The Dutch version of the TSK has been shown to demonstrate good internal consistency (Crombez et al., 1999; Swinkels-Meewisse et al., 2003; Vlaeyen et al., 1995) and test–retest reliability (Swinkels-Meewisse et al., 2003). However, these findings might not generalise to the English version of the TSK.

Responsiveness refers to the capacity of a measure to detect an important change in a parameter of interest

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doi:10.1016/j.pain.2005.05.029

(Beurskens et al., 1995). Establishing the responsiveness of the TSK is important since the measure is often used to assess changes in a patient's fear of movement. If the TSK demonstrates poor responsiveness then the utility of using this measure to detect changes in fear of movement would be called into question.

Identifying a specific cut-off score on the TSK that reflects an important reduction in fear of movement would serve as a useful criterion by which to judge the efficacy of a particular intervention (i.e. how many patients exhibited an important reduction in their fear of movement). Furthermore, it would allow patients to be sub-categorised, on the basis of their cut-off score, following treatment. This would enable investigators to explore whether specific factors predict important reductions in fear of movement. Interventions could then be modified so that they explicitly target those factors that predict important reductions in fear of movement.

Refining the TSK so that it contains fewer items would reduce administration and scoring time. Recent studies have shown that removing four items from the Dutch version of the TSK did not notably compromise either the measure's internal consistency (Goubert et al., 2004; Roelofs et al., 2004b; Swinkels-Meewisse et al., 2003) or test–retest reliability (Swinkels-Meewisse et al., 2003). Future research should investigate whether it is possible to reduce the number of items on the English version without compromising the measure's psychometric properties.

The aims of this study were twofold. Firstly, to determine the psychometric properties of the English version of the TSK in a sample of chronic back pain patients. Secondly, to generate an abridged TSK and subsequently test the psychometric properties of this version.

2. Methods

2.1. Study population

Data were collected from two samples of chronic low back pain (CLBP) patients (duration since onset >3 months) who had been referred to an outpatient physiotherapy department in the United Kingdom. These samples were not independent, with 58% of Sample 1 also included in Sample 2. Patients who exhibited signs indicative of serious spinal pathology, nerve root pain, cauda equina syndrome, widespread neurological disorders or inflammatory disorders were excluded from the study. Data from Sample 1 were used to: (a) analyse the psychometric properties of the TSK items, (b) develop a shorter version of the TSK, and (c) establish test–retest reliability. Data from Sample 2 were used to: (a) determine responsiveness, (b) identify a cut-off score that maximised the TSK's capacity to identify patients who had exhibited an important reduction in their fear of movement, and (c) establish validity (concurrent and predictive).

2.2. Sample 1

One-hundred and eleven CLBP patients completed a series of measures (described below) during their first visit to the physiotherapy department. Demographics and background information are presented in Section 3.

2.2.1. Assessing test–retest reliability

Prior to leaving the physiotherapy department, patients were provided with a further copy of the TSK and asked to complete it three days later and return it in the pre-paid envelope provided. A retest interval of three days was chosen firstly to minimise the effects of any clinical and/or cognitive changes that might have occurred during the retest interval, and secondly to reduce the likelihood of patients being able to recall their original responses to the TSK items, ensuring that patients were judging their current status.

2.3. Sample 2

Data were collected from 103 CLBP patients who had participated in a cognitive-behavioural based intervention that was delivered by physiotherapists. The content of this intervention has been described previously (Woby et al., 2004b). Demographics and background information of this sample are presented in Section 3.

2.3.1. Assessing responsiveness

Patients completed a series of measures (described below) prior to commencing the intervention and again upon discharge. In order to determine the responsiveness of the TSK it was necessary to employ an external criterion of change that allowed the sample to be dichotomised into two groups, namely: (i) those who exhibited an important reduction in their fear of movement, versus (ii) those who had not exhibited an important reduction in their fear of movement. There is currently no 'gold standard' for determining important reductions in fear of movement. Therefore, we employed a 13-point Global Rating Scale (GRS) as the external criterion of change. This required patients to rate to what extent their beliefs/views about their back condition had changed since they started the intervention. Global Rating Scales have been used extensively in back pain related research when assessing the responsiveness of self-report measures (Davidson and Keating, 2002; de Vet et al., 2001; Garratt et al., 2001; Stratford and Binkley, 2000; Stratford et al., 1998; Taylor et al., 1999) and are capable of differentiating between different questionnaires that vary in their responsiveness (Chatman et al., 1997; Kopec and Esdaile, 1995). A copy of the GRS can be found in the Appendix.

2.4. Measures

2.4.1. Roland disability questionnaire (RDQ; Roland and Morris, 1983)

The RDQ is a 24-item self-report measure that assesses disability due to back pain. Total scores range from 0 to 24, with higher scores reflecting greater disability. The measure has excellent reliability, validity and responsiveness (Jensen et al., 1992; Roland and Fairbank, 2000; Roland and Morris, 1983).

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