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Original article

Fear of movement in pre-operative patients with a lumbar stenosis and or herniated disc: Factor structure of the Tampa scale for kinesiophobia

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ABSTRACT

The presence of fear of movement is related to higher disability rates in several patient groups. The purpose of this study was first to analyze fear of movement and the relation with pain and disability in pre-operative patients with low back pain and radiculopathy and secondly to analyze the factor structure of the Dutch version of the Tampa Scale for Kinesiophobia (TSK). The TSK and Pain Disability Index (PDI) were assessed in 128 patients. An explorative factor analysis (EFA) and a confirmatory factor analysis (CFA) of the TSK were performed using Structural Equation Models (SEMs). Fear of movement was significantly related to leg-pain and pain disability. A four-factor model had an explained variance of 49%. After further analyses a solution with three factors (harm, somatic focus, activity avoidance) and nine items (1, 3, 6, 7, 9, 11, 14, 15, 17) had the best fit. Based on the content of this study clinically a factor structure with three subscales with nine items is favorable for usage in pre-operative patients with low back pain and radiculopathy.

1. Introduction

The term fear of movement was introduced by Kori et al. (1990) as an excessive, irrational, and debilitating fear of physical movement and activities resulting from painful injury or re-injury (Kori et al., 1990). The importance of fear of movement has been stressed in the fear avoidance model of chronic pain (Lethem et al., 1983). The presence of fear of movement is significantly related to higher disability rates in several patient groups such as acute low back pain (Swinkels-Meewisse et al., 2003b), chronic low back pain (Vlaeyen et al., 1995a,b; Geisser et al., 2000; Roelofs et al., 2004), fibromyalgia (Turk et al., 1996; Burwinkle et al., 2005), chronic fatigue syndrome (Nijs et al., 2004) an anterior cruciate ligament reconstruction (Kvist et al., 2005) and ostechondritis (Heuts et al., 2004).

In patients with acute low back pain fear of movement has been recognized as important predictor for the development of chronic low back pain (Klenerman et al., 1995). Although Pincus et al. (2006) found no evidence for the role of fear of movement in the chronification of low back pain. The presence of fear of movement in patients with radiculopathy measured pre-operatively was related to more disability and pain 6 weeks post-operatively and with more severe pain 6 months post-operatively (Boer den et al., 2006). Patients with a poor functional status pre-operatively are associated with a poor functional status after surgery (Ostelo et al., 2003). Early identification of fear of movement in this patient group might therefore be of importance to reduce disability and to facilitate rehabilitation post-operatively.

The Tampa Scale for Kinesiophobia (TSK) is a widely used questionnaire to assess fear of movement. Several studies found support for the construct and predictive validity and reliability i.e. internal consistency (Vlaeyen et al., 1995b) and test–retest reliability (Swinkels-Meewisse et al., 2003a). The TSK-17 (17 items) is a powerful predictor of disability in patients with chronic non-specific low back pain (Crombez et al., 2001; Goubert et al., 2004). On the other hand the use of the TSK-17 has been discussed in literature and previous findings with the TSK showed different factor structures in several patient groups (Table 1). A two-factor structure with 13 items originally presented by Clark et al. (1996) dominates especially in patients with chronic pain, although Burwinkle et al. (2005) presented a one-factor structure (4 items) in

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patients with fibromyalgia. In pre-operative patients with a lumbar stenosis and or herniated disc a factor analysis of the TSK has not been performed before. The analysis of this group is interesting because these patients are aware of having a somatic spinal anatomical defect on which they will be operated upon. This group differs from the group with chronic pain that is often investigated in studies describing the TSK. This might have consequences for the factor structure of the TSK.

The purpose of this study was first to analyze if fear of movement in pre-operative patients was present and related to pain and disability. Secondly to analyze the factor structure of the TSK in this patient group.

2. Methods

2.1. Participants

Patients were aged between 18 and 85 years and where hospitalized for lumbar surgery in the Neurosurgery Department of the University Medical Centre of Groningen in the period of March–September 2005. Inclusion criteria for the study were low back pain with radiculopathy, due to lumbar stenosis and or a herniated disc for which surgery was indicated. Excluded were patients with: other neurological diseases, cancer, respiratory insufficiency, rheumatoid arthritis and severe osteoporosis. The average length of the hospital stay was 2.0 days (SD 1.4) including the day of surgery.

2.2. Procedure

Patients were diagnosed by a neurosurgeon all patients were clinically examined and received additional diagnostics i.e. Magnetic Resonance Imaging (MRI). On the day of arrival at the hospital all patients were informed concerning the study protocol and signed an informed consent. The following data were collected: socio-demographics (age, gender, and work status), diagnose, leg-pain and back pain with a Numerical Rating Scale (NRS), the TSK and Pain Disability Index (PDI) (both Dutch language versions). The NRS leg-pain and back pain is an 11-point scale where the end points are the extremes of 'no pain' and 'pain as bad as it could be'. The NRS is a valid scale to assess pain. (Williamson and Hoggart, 2005)

The original TSK is an internationally widely used questionnaire which was translated into Dutch by Vlaeyen et al. (1995a,b). The TSK consists of 17 items, each rated on a 4-point Likert scale ranging from "strongly disagree "to strongly agree". Four items are inversely phrased (4, 8, 12, 16). The total sum has a minimum score of 17 (low fear) and a maximum of 68 (high fear).

The Pain Disability Index (PDI) is a questionnaire developed to measure the degree of interference of pain with normal daily functioning. To complete the PDI the respondent rates on a 11 point scale ranging from 0 (no disability) to 10 (total disability) the degree to which pain interferes with functioning in the following seven areas: family home responsibilities, recreation, social activities, occupation, sexual behavior, self-care and life's-support activity. The total score is derived by summing the responses of the seven items ranging from 0 to 70. The higher the score the more disability. Test–retest reliability is 0.44 (Pearson correlation) the Cronbach's α found for internal consistencies are 0.86 and 0.87 (Pollard, 1984; Chibnall and Tait, 1994).

2.3. Statistical analyses

In case a single item of the TSK was missing the average of the remaining data was used, in all other cases patients were excluded.

Table 1
Factor structures of the TSK described in literature in other patient populations.

Author(s)	Year	Sample and number of subjects (n)	Analyses	Factor(s) and items[a]	% Variance
Burwinkle et al.	2005	Fibromyalgia (233)	Exploratory factor analyses (varimax rotation) and Confirmatory factor analyses	1 factor: fear of movement, 4 items (3, 6, 7, 11)	54.2
Houben et al.[b]	2005	General population people with low back pain (517)	Exploratory factor analyses (oblique rotation) and confirmatory factor analyses	1 factor: fear of movement. 12 items: (1, 2, 3, 5, 6, 7, 9, 10, 13, 14, 15, 17)	31.0
Goubert et al.	2004	Low back pain (188) and fibromyalgia (89)	Confirmatory factor analyses	2 factors: 13 items. Activity-avoidance (items: 1, 2, 9, 10, 13, 14, 15, 17). Pathological somatic focus (items: 3, 5, 6, 7, 11)	Not given
Roelofs et al.	2004	Chronic low back pain (225). Fibromyalgia (391)	Confirmatory factor analyses	2 factors: 13 items. Activity Avoidance (items: 1, 2, 9, 10, 13, 14, 15, 17). Somatic focus (item 3, 5, 6, 7, 11)	Not given
Heuts et al.	2004	Osteoarthritis (227)	Confirmatory factor analyses	2 factors: 13 items. Activity Avoidance (items: 1, 2, 9, 10, 13, 14, 15, 17). Somatic focus (item 3, 5, 6, 7, 11)	Not given
Swinkels-Meewisse et al.	2003	Acute low back pain (272)	Exploratory factor analyses. Oblique rotation	2 factors: 13 items. Activity avoidance (items: 1, 2, 7, 10, 13, 14, 17). Harm (items: 3, 5, 6, 9, 11, 15)	32.9
Geisser et al.[c]	2000	Chronic pain (133), 13 items without reversed items	Exploratory factor analysis with varimax rotation	2 factors[b] 13 items. Avoidance (items: 1, 2, 9, 10, 13, 14, 15, 17). Fear (items 3, 5, 6, 7, 11)	69.2
Clark et al.[c]	1996	Chronic pain (167), 13 items without reversed items	Exploratory factor analysis with varimax rotation	2 factors[b]: 13 items. Activity avoidance (items: 1, 2, 9, 10, 13, 14, 15, 17). Pathological somatic focus (items 3, 5, 6, 7, 11)	49.0
Vlaeyen et al.	1995	Chronic low back pain (129)	Exploratory factor analysis. Oblique rotation	4 factors: 12 items. Harm (items: 3, 6, 11). Fear of (re)injury (items:1, 9). Importance of exercises (items: 4, 12, 14). Avoidance of activity (items: 2, 10, 13, 15)	36.2

[a] Items of the TSK are numbered as described by Vlaeyen et al. (1995a) and presented in Table 3.
[b] Adjusted TSK items for the general population.
[c] Originally used other item numbering, items are renumbered according to Vlaeyen et al. (1995a).