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Pain-related fear of (re-) injury in patients with low back pain: estimation or measurement in manual therapy primary care practice?

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Summary

Objectives: Kinesiophobia is a well-documented risk factor for chronic low back pain (LBP). The objective of this study was to evaluate the ability of manual physical therapist (MPTs) to estimate the level of kinesiophobia in patients with LBP using Visual Analogue Scales (VAS-estimation and VAS-accuracy). MPT scores were compared with scores obtained from the Tampa Scale for Kinesiophobia (TSK) completed by patients with LBP.

Methods: The study comprised 104 patients with LBP and 17 MPTs. Patients independently completed the TSK (TSK-17), with scores ranging from 17 (no kinesiophobia) to 68 (extreme kinesiophobia). The MPTs rated the estimated level of kinesiophobia using the Visual Analogue Scale-Estimation (VAS-est) and the accuracy of estimation using the Visual Analogue Scale-Accuracy (VAS-ac), which range from 0 (0 = no fear resp. or no accuracy, respectively) to 100 (extreme fear resp. or extreme accuracy, respectively). Kendall's tau b was used to determine the level of correlation between scores on the TSK-17 and the VAS-est.

Results: Total patient scores on the TSK-17 ranged from 20 to 60 (mean 35.6 [SD = 7.6]). The mean MPT scores on the VAS-est and VAS-ac were 34.2 mm (SD = 23.6) and 70.4 mm (SD = 7.4) respectively. The TSK-17 scores showed a 'fair' association with the VAS-est scores (Kendall's $\tau b = 0.38$; $p \leq 0.01$) and a 'fair' association with the scores on the VAS-ac (Kendall's $\tau b = 0.28$; $p \leq 0.05$).

Discussion: The assessment of kinesiophobia by MPTs and patient self-reported kinesiophobia showed only a fair association, suggesting some discordance between the clinical judgments of the MPTs and the scores on the TSK-17.

Introduction

Physical therapy (PT) requires a diagnostic procedure that provides insight into a patient's condition and a patient's self-perceived health problems. PT diagnosis is defined as 'a specific professional opinion on the health status of the patient, related to the underlying suffering and based on data from referral, history taking and clinical examination supplemented by medical and psychosocial data'.¹ This definition of PT diagnosis is embraced by the World Confederation of Physical Therapy (WCPT) and is constructed according to the biopsychosocial model.² In cooperation with the patient, the aim of a PT diagnosis is to determine the indication for treatment, the strategy of most appropriate therapeutic care and the outcome prognosis.³⁻⁸ More than 15 years ago, Nordin et al. pointed out that patients with low back pain (LBP) should be involved in decision-making on the treatment plan.⁹ Agreement between the physician and the patient regarding diagnosis, diagnostics and the treatment plan has been associated with higher patient satisfaction and better health status outcomes in patients with LBP.^{10,11}

Towards the end of the 20th century, the suitability of the biomedical diagnostic procedure was questioned and a biopsychosocial procedure introduced in PT in an attempt to improve the diagnostic and therapeutic process for patients with musculoskeletal disorders, particularly for those patients with LBP.¹²⁻¹⁷

With respect to LBP, the transition to chronic LBP and the persistence of chronic LBP were explained by the fear-avoidance model^{18,19} and the cognitive behavioural model of fear of movement and (re-)injury.^{20,21} Central to these models is the idea that pain catastrophizing can induce fear of (re-)injury, which in turn enhances avoidance behaviour, resulting in disuse, activity limitations, depression and restrictions to participation. Kori et al.²² introduced the term 'kinesiophobia', defining it as 'an excessive, irrational, debilitating fear of physical movement and activity resulting from a feeling of vulnerability to painful injury or re-injury'. In patients with LBP, the resulting deterioration may lead to limitations in changing and maintaining positions (sitting, bending and standing),

carrying, moving and handling objects (lifting, and pulling), walking and moving, and moving around using transportation (driving), in addition to impairments of neuromusculoskeletal and movement-related functions (joint mobility and stability, muscle power, tone and endurance), sensory functions (proprioceptive and touch function) and various aspects of pain.²³ A comprehensive ICF Core Set was developed and validated for LBP, covering the typical spectrum of functioning problems in patients with LBP.²⁴⁻²⁶

Increasing evidence supports the current trend towards matching rehabilitation and manual physical therapy to biological (physical), psychological and social components of pain experience and pain-related fear, particularly in patients with (chronic) LBP.²⁷⁻³² Despite recommendations in both international and Dutch clinical practical guidelines³³⁻³⁶ that psychological factors be identified by history taking, clinical examination and validated questionnaires, numerous studies in manual physical therapy practices, in various patient categories, have shown a persistence of the biomedical approach (i.e. without recognition of psychological factors).³⁷⁻⁴⁶

In the diagnostic process preceding manual physical therapy, history taking is the most feasible procedure during the first consultation and can be used to generate a comprehensive picture of the perceived health problems of a patient with LBP. Information on psychological factors can often be gathered during history taking by asking open questions such as ‘Which activities are hindered by your LBP?’ (to trace impairments of movement-related functions and activity limitations), ‘What are your thoughts when you are experiencing LBP?’ (to trace catastrophic cognitions, fear of pain and lack of self-efficacy), ‘What are your feelings when you experience back pain?’ (to trace depression or anxiety) and ‘What do you do in response to LBP? (to trace avoidance behaviour or pain resistance behaviour)’. The method underlying a (semi-)structured history taking, such as the often-used Somatic Cognitive Emotional Behavioural Social (SCEBS) method⁴², is crucial as a first orientation on the prognostic psychological factors that may have influenced the course of a patient’s LBP. Although recommended by Dutch clinical guidelines for LBP, the use of validated

questionnaires in primary care physiotherapy practices is low.^{47,48} Viewed as time-consuming, a limited understanding of questionnaires and limited competencies among PTs with respect to the use and interpretation of questionnaire scores are hampering their practical use in primary care practice.

Based on a patient's answers to open questions, the manual physical therapist (MPT) estimates the absence or presence of psychological factors, such as the fear of physical activities, and if present, the level of fear and avoidance of movement, physical activity and (re-)injury, in combination with other psychological factors.⁴⁹ Literature is currently scarce on the ability of physical therapists to use history taking to identify and estimate avoidance and a fear of movement and physical activity. To the best of our knowledge, only one study has evaluated whether physical therapists are able to identify fear-avoidance beliefs in patients with LBP. In this study, the ratings of physical therapists were compared to validated questionnaires (Fear Avoidance Beliefs Questionnaire [FABQ], Tampa Scale for Kinesiophobia [TSK] and Pain Catastrophizing Scale [PCS]), with the results showing no association between therapists' ratings of perceived patient fear-avoidance and questionnaire data, and thus indicating a potential disconnect between therapist judgments and commonly used fear-avoidance measures.⁵⁰ These findings emphasized the need for further study of the ability of MPTs to judge the fear-avoidance beliefs of patients with LBP using history taking.

Objectives

The aim of this study was to evaluate the ability of MPTs to estimate the level of kinesiophobia in patients with LBP using a Visual Analogue Scale (VAS-estimation and VAS-accuracy) based on open questions during history taking. The scores for MPT estimates were compared with scores obtained from the authorized Dutch version of the TSK⁵¹ completed by participating patients with LBP.

Materials and Methods

Study design

To study a stratified group of patients, the design was cross-sectional. The Medical Ethics Committee of Radboud University Medical Centre Nijmegen, The Netherlands, stated that obtaining ethical approval was not necessary for the present study.

Participants

An invitation to participate in the study was sent to 50 MPTs in the south of the Netherlands, of whom 36 (72%) indicated interest (Figure 1). These MPTs participated in a regional information session that outlined the purpose and content of the study and the expected contribution. Out of 36 interested MPTs, 17 (47.2%) registered for the study. These MPTs were asked to collect data on patients with nonspecific LBP who were referred or self-referred for the first time or who presented with a new episode of LBP each week that met the criteria.

Patients had to meet the following criteria for inclusion: age 18 – 80 years and non-specific LBP (defined as LBP without a specific cause of the pain, e.g. systematic disease or organic disorder), no treatment in the previous three months by the same MPT, and the ability to read and understand Dutch questionnaires. Patients with a history of additional complaints, such as non-radicular pain, were only included if LBP was the dominant symptom. Patients whose history showed signs and symptoms suggested potential non-benign LBP (including previous lumbar surgery) or a specific pathologic condition (such as malignancy, neurologic disease, herniated disc, or rheumatic disease) were excluded. Patients were informed about the purpose and content of the study and their expected contribution. Patients gave oral informed consent.

Procedure

The open interview during the first consultation took place at the MPT practice. The MPTs were asked to complete a general questionnaire assessing demographic and professional characteristics. At the end of the first consultation, they rated their estimation and identification of fear of (re-)injury due to movement and physical activity based on their own conclusions and interpretation of a

patient's answers during history taking, and rated their own accuracy regarding their estimates of the severity of a patient's kinesiophobia. The MPTs were blinded to the self-reported measures completed by the patients.

The patients were asked to complete a general questionnaire assessing demographic characteristics and duration of LBP. Patients were also asked to fill out the TSK-17 prior to history taking with the MPT. The completed TSK-17 was kept by the practice secretary in a sealed envelope.

Measures

Demographic and biographical variables of patients and MPTs

The demographic questionnaire for patients included data regarding gender, age (years) and LBP duration (0-6, 7-12 and > 13 weeks). The general questionnaire for the MPTs covered gender, age (years), education in manual therapy, clinical experience including manual physical therapy (years), work setting (primary care / other), and hours per week spent working with LBP patients (0-15; 16-30 and >30 hours).

Familiarity of MPTs with kinesiophobia and Tampa Scale for Kinesiophobia

The knowledge and familiarity of MPTs with the theoretical concept of kinesiophobia were tested with 8 expert-based multiple choice questions (score 0 -8) (Appendix). Based on a consensus amongst experts (n=10), one point was awarded for each answer that agreed with the experts.

Familiarity with the theoretical construct of kinesiophobia was sufficient if five of the eight answers were correct. The MPTs were also asked if they were familiar with the TSK (yes/no) and if they used the TSK in their practice (yes/no).

Tampa Scale for Kinesiophobia

Patients filled out the Dutch version of the TSK-17.⁵¹ The TSK-17 is a questionnaire that includes 17 items that identify fear of (re-)injury due to movement and physical activities. Items are scored on a

4-point Likert scale with score 1 representing 'strongly disagree' and score 4 'strongly agree'. Total scores, ranging from 17 (no kinesiophobia) to 68 (extreme kinesiophobia), were calculated (which included reversing the scores for items 4, 8, 12 and 16). For patients with acute and chronic LBP, the psychometric properties of the Dutch version of the TSK-17 are good [51-53] and a score of ≥ 37 is considered high.⁵¹

Visual Analogue Scales for Estimation and Accuracy

MPTs rated their estimation and identification of a patient's fear of (re-)injury due to movement and physical activities using the VAS-est. A VAS is a standardized instrument (100 mm) that can measure different variables with high test-retest reliability and criterion-related validity, with established instruments for factors such as pain.^{54,55} To measure fear of (re-)injury based on open questions during history taking, the MPT scored this fear using the VAS-est (0 = no fear; 100 = extreme fear) and the accuracy of his estimation of the severity of a patient's fear using the VAS-ac (0 = no accuracy; 100 = extreme accuracy).

Statistical procedure

Descriptive statistics were used for MPT and patient characteristics in terms of frequency, mean, standard deviation, range and median. Patient's (gender, age, and duration of LBP) and MPT's (gender, age, clinical experience, familiarity of concept, and estimated accuracy) relevant variables in relation to the scores on TSK-17 and the VAS-est were divided into subgroups based on the medians. Kendall's tau-b (τ_b) was calculated in order to investigate the relationship between the scores on the TSK-17 and the VAS-est. The following correlational criteria were used: 0.00 to 0.25 = no to negligible; 0.25 to 0.50 = fair; 0.50 to 0.75 = moderate to good; ≥ 0.75 = good to excellent.⁵⁶ The criterion for significance was set at $\alpha = 0.05$. Statistix (version 10) was used for statistical analyses.

Results

Response rates

All registered MPTs (n=17) submitted data on a total of 105 patients, one of whom was excluded from the analysis due to a missing TSK score, leaving 104 patients in the study (Figure 1).

Insert Figure 1.

Participating Manual Physical Therapists and Patients

The mean age of the MPTs was 41.4 years (SD = 8.1), of whom 82.4% (n = 14) were male. All participants were holders of a master's degree in manual therapy, including two (11.8%) with a Master of Science degree in manual therapy. Clinical experience ranged from 5 to 31 years (mean = 17.9 years [SD = 7.9]). Fifteen MPTs (88.2%) worked more than 30 hours per week with LBP patients, and 16 MPTs (94.1%) worked in primary care. The scores for familiarity with the theoretical concept of kinesiophobia were sufficient (≥ 5 matching answers) for 13 MPTs. The range of the 0 to 8 scores was 2 to 8 (mean 5.6 [SD 1.7]; median 6). Only two MPTs (11.8%) were familiar with the Dutch version of the TSK-17 and no MPT used the TSK-17 in practice. The MPTs' demographic and professional characteristics are summarized in Table 1.

Insert Table 1.

The patients' mean age was 44.5 years (SD = 12) and the sample consisted of 43 male (41.3%) and 61 female participants (58.7%). Fifty-five patients (52.9%) had chronic LBP (> 13 weeks). Patient demographic data are summarized in Table 2.

Insert Table 2.

MPT reported scores on the Visual Analogue Scales for Estimation and Accuracy, and patient reported scores on the Tampa Scale for Kinesiophobia

The mean scores for the MPTs on the VAS-est and VAS-ac were 34.2 mm (SD = 23.6) and 70.4 mm (SD = 7.4) respectively, with medians of 27 and 71. The total scores for patients on the TSK-17 ranged from 20 to 60 (mean 35.6 [SD = 7.6], median 35.5) (Table 2).

Association between scores on the Visual Analogue Scales for estimation and accuracy, and the scores of the Tampa Scale for Kinesiophobia

The TSK-17 scores showed a 'fair' association with the VAS-est scores (Kendall's $\tau_b = 0.38$; $p \leq 0.01$), and a 'fair' association with the VAS-ac scores (Kendall's $\tau_b = 0.28$; $p \leq 0.05$).

Insert Table 3.

Associations between the MPT's ratings for VAS-est and the patient's ratings for TSK-17 were 'fair' (Kendall's τ_b 0.25 – 0.50), and were statistically significant ($p \leq 0.05$) for the MPTs in relationship to the median subgroups of clinically relevant variables including age (median = 41), clinical experience [median = 18], familiarity with the theoretical concept of kinesiophobia (median = 6) and estimated accuracy (median = 71). Fair and statistically significant associations for the median subgroups of patients included age (median = 41) and duration of LBP (≤ 6 weeks; > 12 weeks) (Table 3). One significant association between the scores on the TSK-17 and the scores on the VAS-est was 'moderate' in patients with LBP (duration 7 – 12 weeks; Kendall's $\tau_b = 0.58$; $p \leq 0.05$).

Discussion

Main findings

The present study showed only 'fair' associations between the MPT's assessment of kinesiophobia and patient's self-reported kinesiophobia, suggesting that there might be some discordance between clinical judgments and the commonly used questionnaire for kinesiophobia (TSK-17). Based on their self-reported knowledge of and familiarity with kinesiophobia, the participating MPTs felt sufficiently confident with this construct and judged their own accuracy in the identification of kinesiophobia as sufficient.

All of the correlation coefficients for TSK-17 and VAS-est ranged between 0.25 to 0.50 (fair), with the exception of the correlation of the TSK-17 and the VAS-est in patients with subacute LBP (7-

12 weeks) (moderate). There were only minor differences within the range 'fair' between the correlation coefficients for the subgroups 'clinical experience' in favour of the MPTs with clinical experience ≤ 18 years (all the MPTs are clinically very experienced), 'familiar with the construct of kinesiophobia' in favour of the MPTs with greater familiarity, and 'estimated accuracy' in favour of the MPTs with higher estimations of accuracy. A study by Calley et al. also found no statistically significant correlation between the therapist's ratings for perceived patient fear-avoidance and the TSK-11.⁵⁰

Theoretical construct of kinesiophobia

A plausible interpretation of the weak associations in both studies between the clinical estimation of kinesiophobia and the reported kinesiophobia is that the MPT's judgements of patient's kinesiophobia considered additional facets of the complex construct of kinesiophobia that were not captured by the TSK-17, such as a patient's non-verbal expressions, and use of characteristic words and behaviour during history taking. The MPTs ratings may have also been influenced during history taking by different but related theoretical constructs, such as pain catastrophizing, fear avoidance, disability and disuse. MPTs will be encouraged to participate in a future qualitative study on the complex construct of kinesiophobia.

Clinical Pattern of Low Back Pain

History taking is the first step in a complex clinical reasoning process and is crucial to the understanding of patient's health problems, while at the same time including a patient's personal narrative and the context of problems beyond a strictly chronological sequence of events.^{1,3,4} Narrative reasoning requires more than just good biomedical knowledge and technical skills. It also requires a good knowledge of the biopsychosocial framework (such as communication skills that allow that knowledge to be applied adequately). All participating MPTs had many years of clinical experience in primary care practice and in the assessment of patients with acute, subacute and chronic LBP. Due to this clinical experience, their familiarity with patients with LBP is preserved in

memory patterns that facilitate efficient communication with their patients. Based on their familiarity with the biomedical model and the theoretical construct of kinesiophobia, combined with their clinical experience of patients with LBP, it is likely that the participating MPTs were able to recognize multidimensional patterns of biomedical, psychological and social factors. The MPTs were familiar with the theoretical construct of kinesiophobia but unfamiliar with the TSK-17, and did not use the TSK-17 in practice. Therefore, the VAS-est scores for kinesiophobia were probably based on recognition of multidimensional clinical patterns in patients with LBP, with sufficient estimated accuracy. Multidimensional clinical patterns are implicit in this study and it would be beneficial to elucidate these patterns with greater transparency. Critical, reflective and collaborative reasoning will all help improve the transparency of these multidimensional clinical patterns in relation to patients with LBP.

Clinical Implications of TSK-17

The TSK-17 has been in use since 1990²², includes the modified TSK-11, and is seen as a valuable questionnaire with high psychometric qualities.^{52,53,57} The TSK-17 provides information on the severity level of kinesiophobia, and a score of ≥ 37 is considered high.⁵¹ The mean score on the TSK-17 in this study, 35.6, can be taken as a guideline in interpreting TSK-17 scores. The scores ranged in this study from 20 to 60 e) without classification of subgroups from mild to severe. The lack of clinically-validated score categories as a guideline for MPTs in interpreting TSK-17 scores is one of the current weaknesses of the TSK-17. Clinically-meaningful categories, from subclinical to severe, were recently published for TSK-13 scores.⁵⁸ Another weakness of the TSK-17 is that the scores provide no information on specific activities relevant to patient pain-related fear (such as limitations in changing and maintaining body position, carrying, moving and handling objects, and walking and moving).²⁴⁻²⁶ If a patient experiences pain-related fear related to only one or a few activities (e.g., lifting, bending, carrying or prolonged sitting⁵⁹) then the TSK-17 score from the patient's perspective will be low, whereas the MPT will award high pain-related fear scores for these activities. This

consideration may explain the low correlation between the TSK-17 and the VAS-est in this study.

There are indications that the patient, upon re-exposure to the feared activity, can reduce pain-related fear of (re-)injury.⁶⁰⁻⁶² The use of 100 standardized photographs (PHODA® [Photograph series of Daily Activities]) representing the most common activities relevant to pain-related fear of (re-)injury in patients with LBP is useful when identifying activities that trigger a patient's pain-related fear.⁶³ This method is currently used as a more direct measure for the development of an individually-tailored, graded in vivo exposure program in LBP patients with pain-related fear of (re-)injury. The PHODA® is also available in a short electronic version with good psychometric properties.

64

Limitations of the study

There are potential limitations to this study. The participating MPTs had considerable clinical experience of working with patients with LBP but had no experience with the TSK-17. More experience of the TSK-17 and other questionnaires, such as FABQ, in assessments of patients with LBP would have improved the MPTs' accuracy in rating pain-related fear of (re-)injury due to movement or physical activity.

The estimation of kinesiophobia was only based on history taking by the MPTs as a first step in the clinical reasoning process and was measured using VAS-est. It should be noted that history taking by MPTs is mainly characterized by querying biomedically oriented factors in relation to LBP⁴²⁻⁴⁶ and does not sufficiently address psychological factors as recommended in systematic reviews and in national and international LBP guidelines.^{33-36,65,66} It may be worthwhile to develop a more comprehensive clinical tool that includes history taking and which captures the physical activity-related behavioural aspects of pain-related fear of (re-)injury during a clinical examination. A more comprehensive clinical tool might more consistently reflect the multidimensional construct of kinesiophobia.

In addition to many years of clinical experience, the majority of participating MPTs were educated in the biomedical model of pain. In the context of this study no specific training was provided in the identification of psychological factors that correlate with pain-related fear of (re-)injury or kinesiophobia, so that the unbiased estimations of the MPTs could be assessed. Despite no experience with or use of the TSK-17 within their practices, the MPTs were aware of the theoretical construct of kinesiophobia. Perhaps training MPTs in the recognition of pain-related fear factors for (re-)injury in people with LBP, combined with the incorporation of these factors in movement and activity-related programs (such as graded exposure in vivo programs), would improve the clinical relevance of the results of the present study.

Conclusion

In summary, the association between the MPT's assessment of kinesiophobia and the patient's self-reported kinesiophobia in patients with LBP were fair. We would encouraged MPTs not to rely solely on their personal clinical judgement, but also to employ validated self-reported measures such as the TSK-17 and (movement-related) clinical tests. In conjunction with their clinical examination, these instruments will aid the assessment of (the level of) kinesiophobia and the type of fear-related movement or physical activity in patients with LBP.

This study also suggests that future research should be directed to forming a consensus on conceptual and operational definitions of the multidimensional construct of pain-related fear of (re-)injury and the application of the TSK-17. MPTs are encouraged to take part in future consensus meetings.

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Figure 1. Flowchart of manual physical therapists' (MPTs) responses and reasons for no interest, dropouts and missing.

Table 1. Demographic and professional characteristics of manual physical therapists (n=17)

Table 2. Patient demographic and self-rating measures (n=104)

Table 3. Median subgroup relationships between Tampa Scale for Kinesiophobia (TSK-17) and Visual Analogue Scale estimation (VAS-est) in patients with low back pain (n=104)