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Portuguese Language Version of the Tampa Scale for Kinesiophobia [13 Items]

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ABSTRACT

Objectives: The aim of this study was to translate and adapt the Tampa Scale for Kinesiophobia to the Portuguese language and culture [TSK-PT], and validate its use in Portuguese patients with chronic low back pain [CLBP].
Methods: The procedures were performed following published international guidelines. Patients with CLBP were recruited to complete the TSK-PT and visual analog scales [VAS] for pain and for confidence in low back movement. A portion of the same patients also completed a second TSK-PT questionnaire after a seven-day interval to establish test-retest reliability. After three months, all of the original patients completed the questionnaire again to assess its responsiveness using standardized effect size and standardized response mean.
Results: At baseline, 166 patients with chronic LBP completed the series of questionnaire instruments. After an interval of seven days, forty one patients again completed the series of instruments. Three months after baseline, all 166 patients again completed the questionnaire series. The Cronbach alpha of 0.82 indicated good internal consistency of the TSK-PT total score, and the one-week intraclass correlation coefficient of 0.99 indicated exceptional test-retest reliability. A three-factor solution could be found on factorial analysis. There were significant correlations between the TSK-PT total score and both VAS Pain and VAS Confidence scores. The standardized effect size of the TSK-PT was 0.50 and the standardized response mean was 0.67.
Conclusions: The TSK-PT has proven to be a valid and reliable tool in the assessment of kinesiophobia in patients with CLBP.
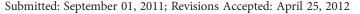
KEYWORDS: Kinesiophobia, pain, fear of movement

INTRODUCTION

Self-reporting measures are very common instruments for exploring different impacts of impairments in bodily functions. Kinesiophobia is defined as an excessive and debilitating fear of physical movement and activity, resulting from a feeling of vulnerability to painful injury or reinjury (1). It is a type of impairment that simultaneously affects neurobiological and psychological pain factors, as well as all components of movement confidence (2). The fear of movement is an important factor in increasing painful symptoms associated with chronic low back pain [CLBP]. Avoiding movement maintains incorrect posture, exaggerates tension, and extends the impairment (3). The

Tampa Scale for Kinesiophobia [TSK] (4) was specifically developed for the assessment of kinesiophobia (1) and collects information on the degree of comfort, security, and preparation for movement.

The original English version of the TSK is a set of 17 questions, using a four-point Likert scale, assessing the subjective perception of the subjects related to their security and confidence to perform movements. The sum of the scores obtained on each issue will typically range between 17 and 68, where higher scores represent greater levels of perceived fear. Short versions of the TSK, such as the TSK-13 or TSK-11 items, are also used (5). It has been postulated that the use of the TSK without the four inverse items

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[items 4, 8, 12, and 16] gives better psychometric measures and has the advantage of being a shorter version (6). These factors were significant in the decision to opt for the shorter 13-item TSK for Portuguese validation. The TSK has been validated for different cultures, including Norwegian (7), Dutch (2), Swedish (8), French (9), and Brazilian (10). However, no adaptation and validation of the TSK for the Portuguese culture could be found in the literature and there is no other self-report questionnaire validated for the Portuguese language and culture for measuring kinesiophobia.

The aim of this study was to cross-culturally adapt the TSK-13 to the Portuguese-speaking culture, using a sample of patients with CLBP, in order to explore its reliability and validity, including its factor structure and responsiveness.

MATERIALS AND METHODS

Ethical Oversight

The study protocol was approved by the ethics committee of the Scientific Board of the Faculty of Human Kinetics – Technical University of Lisbon.

Cross-Cultural Adaptation

The cross-cultural process was carried out following established guidelines (11). Prior to the validation process, the original English TSK-13 items were translated to a Portuguese version [TSK-PT] by two native Portuguese-speaking independent professional translators [T1 TSK-PT and T2 TSK-PT] at the Language Centre of the Polytechnic Institute of Castelo Branco. After combining these into a single Portuguese version [T12 TSK-PT], two other professional translators, without previous contact with the original version of TSK, performed the T12 TSK-PT back-translation to English. A review group consisting of two physiotherapists [from the research group, one of them a methodologist], two of the professional translators, and one language expert then agreed on a pre-final version. In order to ensure that the pre-final TSK-PT version was comprehensible, it was also reviewed and tested on a panel of 10 patients with CLBP. In their opinion, the TSK-PT was a questionnaire that was short, quick and easy to answer, understandable, useful, and suitable for the target population. They unanimously found that the language was simple, clear, and colloquial. The questionnaire took between four and six minutes to answer. No problematic questions or concepts were identified and no difficulties were mentioned in relation to the content of the translated items. The TSK-PT is provided in Appendix 1.

Patients with nonspecific CLBP were recruited from 14 Portuguese physiotherapy clinics [nine in the center, four in the south, and one in the north of the country]. Subjects were selected after obtaining informed consent and checking inclusion and exclusion criteria. To be included in the study, patients were required to undergo physical therapy treatments [related to CLBP] for at least four weeks, and to have experienced low back pain for at least 12 weeks. Subjects were excluded if they had neurological diseases or any other disabling condition, or if they were unable to read or write Portuguese fluently.

The 13-item TSK-PT was administered as part of a package that also included a socio-demographic questionnaire [age, gender, level of education, work status], a medical questionnaire [physical therapy treatment duration and/or prior back surgery], and a patient-reported outcome instrument visual analog scale [VAS] to measure low back pain [0–100 mm VAS Pain] and low back movements confidence [0–100 mm VAS Confidence]. The VAS Pain form states "On the line, mark the pain that you have at this moment – consider the left side to be complete absence of pain and the right side the worst imaginable pain." The VAS Confidence form states, "On the line, mark your level of confidence to perform movements, based on your perceived security of movement – consider the left side to be no confidence and the right side to be total confidence."

The Statistical Package for Social Sciences version 16 was used for the data analysis. Principal component analysis was used to evaluate the factor structure of the TSK-PT. Factors with eigenvalues >1 were extracted, and the factor structure was explored by Varimax orthogonal rotation. Factors loading ≥0.30 were included in the representation.

Construct validity was tested by relating the TSK-PT total score with variables that could be expected to have an association with them [VAS Pain, VAS Confidence, and duration of pain episode]. Construct validity was tested using Spearman's correlation. Spearman's correlation coefficients were interpreted as an excellent relationship when r ≥ 0.91; good, 0.90–0.71; fair, 0.70–0.51; weak, 0.50–0.31, and little, r ≤ 0.30. A P-value of 0.05 was considered the level of significance (12).

In order to calculate test–retest reliability, a subgroup of patients were asked to fill in the TSK-PT one week after their first response. The reproducibility of the test was evaluated using an intraclass correlation coefficient [ICC], and a reliability coefficient of 0.70 or better was considered acceptable for group comparisons (13).

TABLE 1. Characteristics of the Subjects

	Total study [n = 166]				Test–retest subgroup [n = 41]			
Characteristics	N	%	Mean	SD	N	%	Mean	SD
Age [year]			50.55	10.80			47.46	12.32
Females	105	63.3			24	58.5		
Married	157	94.6			38	92.7		
Working	144	86.8			36	87.8		
VAS pain score T0			62.6	19.4			61.9	20.5
VAS confidence score T0			34.2	18.8			34.3	19.8
TSK-PT total score T0			33.11	7.26			33.51	7.08

SD, standard deviation, VAS, visual analog scale, T0, baseline, TSK-PT, Portuguese version of the Tampa Scale for Kinesiophobia

Internal consistency was calculated using Cronbach's alpha and corrected item-total scale correlations averaged for all items of the TSK-PT. An alpha value between 0.70 and 0.95 was considered to represent acceptable reliability (13).

Responsiveness three months after the first measurement was calculated using the standardized effect size and standardized mean response. A value of 0.80 or higher was considered high responsiveness (13).

RESULTS

A total of 166 patients were recruited and participated in the baseline and three-month assessments. Forty-one of the original patients also completed the series of instruments one week post-baseline to establish test–retest reliability. The characteristics of the patients are presented in Table 1, as well as the characteristics of the test–retest group. A three-factor solution was found in the factorial analysis of TSK-PT. Eigenvalues greater than 1 were 5.4, 1.8, and 1.3, respectively, and the factors explained 65 percent of the variance. Principal component analysis suggested that items 2, 3, and 11 loaded on two factors were included on the component where they had the highest load [Table 2]. There were significant correlations between the total score of the TSK-PT and both the VAS Pain and VAS Confidence scores [Table 3]. The correlation between the TSK-PT total score and patients' pain was positive, but negative for movement confidence.

The TSK-PT Cronbach's alpha coefficient was 0.82, and the item total scale correlations were between 0.331 and 0.749, except for items 1, 10, and 13. The last two items showed values lower than 0.30 [0.016 and 0.133, respectively], and item 10 showed a value of 0.300. The one-week ICC was 0.99 for the TSK-PT total score, and ranged from 0.94 to 0.98 for the 13 items of the scale. The mean total score of TSK-PT in the first trial in all patients [n = 166] was 33.11 ± 7.26 and in the repeat one week later on the retest

TABLE 2. Main Component Analysis of the TSK-PT [N= 166]

Item	Activity avoidance	Somatic factors	Pain factor
1		0.719	
2	0.595	0.598	
3	0.775	0.312	
4	0.790		
5	0.814		
6			0.636
7	0.765		
8	0.823		
9	0.736		
10		0.694	
11	0.711	0.495	
12	0.611		
13			0.840

TABLE 3. Relationship between the TSK Total Score and the Patient's Pain and Movement Confidence [n = 166]

		VAS pain	VAS confidence	TSK-PT total score
VAS pain	r	1.000	−0.565	0.691
	P		0.000	0.000
VAS confidence	r	−0.565	1.000	−0.772
	P	0.000	.	0.000

VAS, visual analog scale.

group [n = 41] was 33.51 ± 7.08, but there was no statistical significance between these two scores.

The standardized effect size of the TSK-PT was 0.50 and the standardized response mean was 0.67.

DISCUSSION

Portuguese is the official language of Portugal and Brazil, but the two cultures are different. As an example, the expression throughout the questionnaire "might the injury" was equivalent to semantic Portuguese as "me magoar" and Brazil as "me machucar." "Me machucar" in Portuguese from Portugal means to crush something with your body weight and only

figuratively relates to "me magoar", so the option in Portuguese of Portugal could not be "me machucar." Considerations like this have motivated our choice for this validation study.

The cross-cultural adaptation process resulted in a TSK-PT version that was easily understood by the patients, and no problems were encountered during its application. We used the 13-item TSK short version according to the recommendations for its use for research and clinical purposes, due to its superior reliability level (7,10,14).

The factor structure analysis of TSK-PT showed three factors explaining 65.12 percent of the total variance in CLBP patients. The Norwegian version of the TSK-13 also showed a three-factor solution, which explained only 49.4 percent of the variance (7). In our case, the main component analysis of the TSK-PT showed an association model, with the first component concerning questions related to "activity avoidance," a second component in relation to "somatic factors," and a third component related to "pain factors." In general, the TSK bibliography attempts two-factor solutions in different versions of the scale. These two factors, that is, somatic factors and activity avoidance, are related independently of patient condition (5,15). The results of our study are in accordance with the existing literature. However, our study also showed a third component with only two questions linked with "pain" perception. The heterogeneity of the pain concept, much valorized by CLBP patients, could explain the discrepancy between the answers and link the two questions for one isolated component.

The TSK-PT showed good reliability and internal consistency with a Cronbach's alpha value of 0.82. Similar values have been obtained in validations of the TSK in other languages. In a psychometric exploration of the original English version in patients with chronic back and/or neck pain, alpha values of 0.84 were obtained (16). In a Dutch version of the TSK in patients with low back pain, the authors obtained alpha values of 0.76 (14), 0.77 (2), and 0.80 (15). In a Norwegian version in patients with sciatica related to disc herniation, the authors obtained an alpha of 0.81 (7). In a Brazilian version of TSK in patients with low back pain, alpha values of 0.95 were obtained, based on interview methodology (10). With the exception of the Norwegian (7) and Brazilian versions (10), all other authors used the 17-item TSK scale, which resulted in lower alpha values. Swinkels-Meewisse et al. (14) verified that if the TSK-13 item questionnaire was used, alpha values increased from 0.76 to 0.80 in his investigation [similar to the values found in our study].

The results of item-total scale correlations in TSK-PT were between 0.331 and 0.749. With the exception of three items [1, 10, and 13], there were no problems with the other items in the psychometric explorations of TSK scales in other languages. In the original English version, all the items showed good values on item-total scale correlations (16).

Our results indicate that items 1, 10, and 13 in the TSK-PT may generate confusion in the subjects regarding the interpretation of the question. If these items were deleted from the scale, the total alpha value would change from 0.82 to 0.86. In our opinion, this small change in the total alpha does not justify the withdrawal of these items because an alpha of 0.82 is a sufficiently high value to justify retention of all items, and it allows the scale to keep its original appearance.

High ICC for the total score and for the 13 items of the questionnaire indicated an acceptable stability of the TSK-PT over time. Also, the mean total TSK-PT score after a one-week interval was similar and without significant statistical difference between the two times. Analogous results were obtained in other studies which have observed a good stability in TSK results over similar time periods (7,10,15).

The hypothesis for construct validity was confirmed: the proposal that the TSK-PT was associated with the concept of fear and movement confidence was correct. The construct validity of the questionnaire had already been measured in other psychometric studies using patients with low back pain, through significant correlations with other self-reported measures, body functions, and behavioral performance/function tests (7,14). In the original English version of the TSK (16), even using the 17-item scale, the scores were significantly correlated with the physical activity and work sub-scales of the Fear Avoidance Beliefs Questionnaire [FABQ] [$r = 0.53–0.35$] and some pain measures, for example, the Pain Catastrophizing Scale [$r = 0.51$] and VAS Pain [$r = 0.23$]. Using the 17-item TSK Dutch version, Crombez (15) observed similar correlation coefficients: FABQ work [$r = 0.53$], FABQ physical activity [$r = 0.76$], and VAS Pain [$r = 0.27$]. In the Norwegian version using the 13-item TSK (7), the same tendency was observed: FABQ work [$r = 0.38$], FABQ physical activity [$r = 0.51$], and VAS Pain [$r = 0.18$]. In the case of the TSK-PT, the relationship with the VAS Pain score showed a fair correlation [$r = 0.69$, $P = 0.00$], the best possible association compared with other cited validations. In our opinion, that was possible based on the characteristics of the population of our study and its sensibility to chronic pain, namely the influence of the present episode of high pain intensity, which was responsible for patients' adherence to the physiotherapy care program.

The good level of inverse association between VAS Movement and VAS Confidence and the TSK-PT total score [r = −0.77, P = 0.00] suggests that the TSK-PT offers a good capacity to evaluate the confidence that low back pain patients feel in their ability to perform movements.

Our study showed low to moderate levels of responsiveness on assessment of the TSK-PT three months after the first application. Other authors have found similar vulnerability in this scale in other cultures (7,10). This means that the TSK-PT has a limited capacity for identification of small changes across time in patients with nonspecific CLBP.

In our study, there were some limitations, including the lack of use of another instrument to measure fear or avoidance to assess the construct validity due to the fact there are no alternative measures adapted for Portuguese language and culture. In addition, this validation process only assessed a sample with CLBP, and other studies are necessary with other samples and other patients for psychometric exploration of the TSK-PT 13-item scale.

In conclusion, we found that the translation and cultural adaptation of the Portuguese version of TSK, using patients with unspecific CLBP, showed good construct validity, high internal consistency, good test–retest reliability, and low to moderate responsiveness.

Declaration of Interest: The authors did not receive any form of benefit or subsidy and have no other relationships that might lead to a conflict of interest.

AUTHOR NOTES

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APPENDIX

ESCALA DE TAMPA DE CINESIOFOBIA (13 Items)

THE TAMPA SCALE
MILLER, KORI & TODD
TAMPA, FLORIDA
1991

1   **= Discordo Plenamente**
2   **= Discordo**
3   **= Concordo**
4   **= Concordo plenamente**

**LEIA CADA PERGUNTA E ASSINALE O NÚMERO
QUE MELHOR CORRESPONDE AO QUE SENTE**

Nº		1	2	3	4
1	Tenho medo de me magoar se fizer exercício.				
2	Se tentasse ultrapassar a dor, a intensidade dela iria aumentar.				
3	O meu corpo está a dizer-me que tenho algo de errado e grave.				
4	As outras pessoas não levam o meu estado de saúde a sério.				
5	O acidente que sofri colocou o meu corpo em risco para o resto da vida.				
6	A dor significa sempre que me magoei.				
7	Tenho medo de magoar-me acidentalmente.				
8	Tentar não fazer movimentos desnecessários é a melhor coisa que eu posso fazer para evitar que a dor se agrave.				
9	Não sentiria tanta dor se não se passasse algo de potencialmente grave no meu corpo.				
10	A dor avisa-me quando devo parar de fazer actividade física, evitando assim que me magoe.				
11	Não é seguro para uma pessoa com a minha condição física ser fisicamente activa.				
12	Não posso fazer tudo o que as outras pessoas fazem, porque me magoo muito facilmente.				
13	Ninguém deveria ter que fazer actividade física quando sente dor.				