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Reliability and Validity of Kannada Version of Tampa Scale of Kinesiophobia (TSK-KA-11) - A Validation Study

Maitri Shastri[1], Mageswaran Nagarajan[2], Syamala Maheshwari[3]

[1]Assistant Professor, Dr. APJ Abdul Kalam College of Physiotherapy, [2]Principal, KVG Institute of physiotherapy, Sullia, Dk, [3]Lecturer, KVG Institute of Physiotherapy, Sullia, DK.

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Abstract

Background: Chronic widespread pain disorders prevalence has been reported to be 1%-15%. The global prevalence of MSDs ranges from 14% to as high as 42%. Fear of movement/(re)injury have been considered one of the most significant predictors of pain perpetuation and pain behavior, and is a central construct in the cognitive-behavioral model of Fear-Avoidance. One of the most widely used instruments to measure fear of movement or (re)injury during movement is TSK-11.

Objectives: To translate TSK-11 questionnaire into Kannada version. To find out test-retest reliability of TSK-11 in Kannada version among chronic musculoskeletal pain subjects. To find out construct validity of TSK 11 in Kannada version among chronic musculoskeletal pain subjects.

Methodology: Translation and cross-cultural adaptation of the original English versions of the TSK-11 was performed according to the published guidelines. The psychometric properties were evaluated by administering the questionnaire to 70 chronic musculoskeletal pain disorders patients. Test- retest reliability was estimated by internal consistency and test-retest assessment. Patients completed questionnaire twice with an interval of 1 week. Convergent construct validity was performed in relation to FABQ-KA.

Results: With respect to the chronic pain samples, the TSK-11 total score was significantly and positively correlated with catastrophizing, depression, anxiety, and pain intensity, and fear avoidance behavior of FABQ scores. Test-retest reliability was tested by using ICC (Baseline and post 1 week) internal consistency was reported in terms of Cronbach's α (0.89). Cronbach's α coefficient was calculated for item-scale correlation. It was calculated from first and second administration of TSK-KA-11(Level of significance was set up $P > 0.05$).

Conclusion: Results suggest that the TSK-KA-11 has been successfully translated and cross-culturally adapted from English to Kannada version and provides with the evidence that the TSK-KA-11 is a reliable and valid measure to assess 'Fear of re-injury' in Kannada-speaking chronic musculoskeletal pain disorder patients.

Keywords: TSK-KA-11; Chronic musculoskeletal pain disorders; Fear of re-injury; Reliability, Validity.

Corresponding Author: Mageswaran Nagarajan, Principal, KVG Institute of Physiotherapy, Sullia, Dakshina Kannada

Mobile: 9500101421

E-Mail: mageshbpt@gmail.com

Introduction

Musculoskeletal disorders (MSD) have been defined as one of the most common causes of severe long-term pain and physical disability which seems to affect hundreds to millions of people across the world[1] and are characterized by the presence of discomfort, disability, or persistent pain in the joint, muscles, tendons, and other soft tissues, caused or aggravated by repeated movement, and prolong faulty or forced body posture.[2] Chronic pain has been defined as pain that persists past normal healing time. Usually pain is regarded as chronic when it lasts or recurs for more than 3 to 6 months.[3]Chronic widespread pain disorders prevalence have been reported to be 1%-15%.[4] The global prevalence of MSDs ranges from 14% to as high as 42%.[5] The World Health Organization (WHO) estimates that 40% of people over the age of 60 years suffer from MSD.[5]

According to the 'fear avoidance' model of chronic pain, there are two extreme responses to pain-related fear: confrontation and avoidance.[6] Avoidance of activities causing more stress at the back maintains or aggravates the pain related fear while a reduction in the pain related fear is observed due to confrontation.[6] This model states that catastrophic thoughts about pain are associated with avoidance behaviors and hypervigilance to bodily sensations and pain.[6] Depression and disuse (state of inactivity) may be caused that further leads to decreased pain tolerance and therefore a painful experience.

A cognitive-behavioral oriented model for chronic pain has been proposed which is based on fear avoidance model.[6] Research has supported the relation between pain catastrophizing and pain-related fear, pain-related fear and disability, and between pain-related fear and increased body awareness and attentional focus toward pain and noxious body stimuli.[6] Empirical evidence supports the notion that the persistence of pain equally depends on these cognitive, behavioral, affective, and social factors.[7] Among these, fear of movement/(re)injury have been considered one of the most significant predictors of pain perpetuation and pain behavior, and is a central construct in the cognitive-behavioral model of Fear-Avoidance.[7] The Tampa Scale of Kinesiophobia (TSK) is one of the main instrument that is based on this model.[7]Back pain patients who exhibit higher levels of pain related fear report higher levels of pain, disability and performs less well on physical performances when compared to those having lower levels of pain related fear.[8]Also it has been observed that reduced level of pain related fear contributes to reduced level of disability.[8]

One of the most widely used instruments to measure fear of movement or fear of (re)injury during movement. It has been translated into 10 languages.[9] The TSK-11 is the most widely used; 17 it contains 11 items from the original 17-item questionnaire, with items 4, 8, 9,12,14 and 16 removed.[9] Each item is scored on a 4-point Likert scale, ranging from 1 'strongly disagree' to 4 'strongly agree'; total scores vary between 11 and 44, with higher scores indicating higher levels of fear of movement-related pain.[9] The TSK-11 groups items on two distinct factors: activity avoidance (e.g., 'I'm afraid that I might injure myself if I exercise'); and somatic focus (e.g., 'Pain always means I have injured my body').[9] The instrument is administered on paper or online, and takes 4 to 8 minutes to complete.[9]

Cronbach's alpha values of the TSK-11 range from 0.7 to 0.9, indicating acceptable to excellent internal consistency. Test-retest reliability is high (intraclass correlation coefficient > 0.7). Concurrent validity is also good, whilst construct, criterion, and predictive validity range from moderate to good. The TSK-11 exhibits extensive convergent validity with other tests. For instance, the authors reported cross-sectional convergent construct validity with the Pain Catastrophizing Scale23 (assessing cognitive-affective responses to anticipated/actual pain). Sensitivity and specificity for the TSK-11 are estimated to be 66 and 67%, respectively.[9] The authors developed age-based and gender-based normative scores, which are invariant across different pain diagnoses. Individual test scores can be compared to these normative scores to determine whether fear of movement related pain is within the normal range (1 SD), elevated (> 1 SD), or excessive (> 2 SD).[9]

Materials and Methods

This was a validation study conducted among the subjects with chronic musculoskeletal disorders

in Srinivas College of Physiotherapy and Research Centre OPD, various private Clinics in and around Karnataka during April 2019 to May 2020. This study was approved by the institutional ethical committee of Srinivas college of physiotherapy and Research centre and was also approved to get the access of patient records those were included in the study from other participating hospitals and all participants provided the informed consent.

The subjects included in the study were of both genders in the age group of 25-85 years suffering with chronic musculoskeletal disorders and were able to speak, read and write Kannada. The principal investigator is a qualified physiotherapist, currently pursuing master's degree at Srinivas College of Physiotherapy and Research Centre, Mangalore. Materials used were Data recording sheet- To record the data, English version of TSK-11, Kannada version of FABQ. The exclusion criteria includes Serious spinal pathology (Tumors), Nerve root pain, Cauda equina syndrome, Neurological disorders or inflammatory disorders , Spine Fracture, Unstable Angina and Cerebrovascular events. All participants were asked to sign written consent form stating the voluntary acceptance to participate in the study.

Cross cultural adaptation

The guidelines for cross-cultural adaptation of the TSK 11 will be subjective questionnaire, the TSK 11 will be cross-culturally adapted into Kannada version of TSK 11 in six steps: **Step 1:** Initial translation to Kannada language/ forward translation: The first stage in adaptation is the Initial translation. Initial translation of TSK 11 will be done into Kannada language from original English version of TSK 11. This step will be performed by two bilingual individuals whose native language is Kannada. One is the orthopedic surgeon and other is the physical therapist with extensive clinical experience in musculoskeletal disorders, to perform an initial translation from English to Kannada. **Step 2 Synthesis:** After discussion, the 2 translators produced a consensus version of the TSK-11.**Step 3 Back translation:**

Back translation of preliminary TSK 11 in to English will be conducted by two native English speakers who are fluent in Kannada. The two translators should neither be aware nor be informed of the concepts explored, and should preferably be without medical background. **Step 4 Reviewer's committee:** An expert committee, including forward and back translators and a health professional and a language professional will review all translations and develop the pre-final version of TSK 11 kannada version with emphasis on semantic, idiomatic, experimental and conceptual equivalence in relation to original back translated TSK 11 versions. **Step 5 Pre-testing:** According to inclusion and exclusion criteria the pre-final questionnaire will be administered to those who were diagnosed with chronic musculoskeletal pain. The interviewer will report on each respondent understanding the questionnaire items and making decision on them. As no further adaptation is indicated, the pre-final and final TSK 11 KA will be identical. The objective is to assess whether the translated questionnaire is understandable, the vocabulary is appropriate and also the expression is relevant for Kannada culture. **Step 6 Validation study:** Construct validity with FABQ will be obtained by the Experts and the translators. Reliability will be tested by internal consistency and test-retest reliability. For test-retest reliability questionnaire has to be given at first visit and after 1 week. So that person may not copy the same data as well as he/she will not forgot.

Results

Data were tabulated in Microsoft EXCEL computer software and were analyzed by using SPSS windows version (16). Study evaluated the test-retest reliability of TSK-KA-11 among 70 chronic pain musculoskeletal disorders patients and for validation construct validity was used. Descriptive statistics were done by finding the mean values of age, weight, height, BMI and the data resulted from TSK-KA-11 were provided. It is reported in Mean ± standard deviation (95% CI). Test-retest reliability was tested by using the ICC (Baseline and post 1 week) internal consistency was reported in terms of Cronbach's α(0.89). Cronbach's α coefficient was calculated for item-scale correlation. It was calculated from first and second administration of TSK-KA-11(Level of significance was set up $P > 0.05$).

The construct validity was assessed on 5-point Likert scale, where higher values indicated higher risk of having fear and those on lower having less risk for the same. With respect to the chronic pain samples, the TSK-11 total score was significantly and positively correlated with catastrophizing, depression, anxiety, and pain intensity, and fear avoidance behaviour of FABQ scores.

Table 1: Descriptive statistics for demographic characteristics of patients with chronic musculoskeletal pain disorder

Variables	Mean ± SD
Age	45.23 ± 13.48
Height	155.21 ± 14.54
Weight	61.13 ± 13.05
BMI	27.32 ± 5.61

Table 2: Gender distribution

Gender	Frequency
Male	39
Female	31

Table 3: TSK-KA 11 scores at baseline and after 1 week

	Baseline (mean ± SD)	Retest (mean ± SD)
TSK-KA 11	35.23 ± 5.89	29.43 ± 8.25

Table 4: Cronbach's α

Internal consistency in terms of Cronbach's α for item scale correlation

Content	Cronbach's alpha
TSK-KA 11	0.895

Table 4 shows excellent correlation (Cronbach's alpha= 0.895)

Table 5: Test-Retest Reliability of TSK- K11 in Kannada Version

Inter-class Correlation Coefficient

	ICC	P- value
TSK-KA 11	0.075	0.567

Discussion

This study aimed to cross culturally adapt the Kannada version of TSK-11 and to test the psychometric properties of the Kannada version of TSK-11 in 90 subjects with chronic musculoskeletal pain disorders.

In this study 70 patients who fulfilled the inclusion criteria were participated. TSK-11 questionnaire was given at the first visit with 1week interval to measure the test-retest reliability and to measure validity. The results of the study showed good correlation ICC=0.07, $p<0.5$ indicating it is statistically significant and applicable to generalize to the broader population of interest and internal consistency (Cronbach's alpha=0.89) indicating better internal consistency.

In the Italian version of the TSK in subacute/ chronic LBP, the internal consistency of the TSK-I was acceptable: Cronbach's α was 0.772 for the total score, and slightly lower for the subscales. The test-retest reliability of TSK-I assessed on day 1 and day 7 was characterized by a highly significant correlation (ICC_0.956, 95% CI), with each item showing satisfactory ICCs ranging from 0.863 to 0.980. Also, it showed good psychometric properties, such as internal consistency, test-retest stability and discriminant validity.[10]

In the Portuguese version of TSK, it showed low to moderate levels of responsiveness on assessment of the TSK-PT three months after the first application.[14]

The Chinese version of SC-TSK, demonstrated good internal consistency, test retest reliability, and construct validity with Cronbach's α between 0.70 and 0.95 (i.e. excellent) and ICC value more than 0.70 (excellent reliability).[12]

In the Spanish version of the TSK-11 global score was significantly correlated with fear of movement as measured by that instrument, the association was quite low (r = .23), suggesting that they are measuring different constructs.[7]

It was found that TSK-KA-11 item showed test re-test reliability showed good ICC (r =0.07), $p > 0.00$ i.e. statistically significant. The internal consistency (Cronbach's α = 0.89) i.e. excellent correlation.

The construct validity between FABQ-KA and TSK-KA-11 showed that FABQ-KA was measuring more of the fear related to pain whereas TSK-KA-11 showed fear that is related to re injury and re occurrence of similar pain.

The TSK-KA-11 is a simple self -report questionnaire and takes 4 to 8 minutes to complete. The result showed that it was possible to translate this functional status questionnaire into other languages without losing psychometric properties of the original English version.

Limitations of the study

TSK-KA-11 makes no clear differentiation between pain and harm expectancies. Due to this contamination of harm/pain expectancies, the TSK-11 may be less suitable to determine whether exposure treatment is recommended. Also, since there is no gold standard value for assessing the fear in Kannada version of any questionnaire, it is impossible to measure the criterion validity until then.

Conclusion

Our results suggest that the TSK-KA-11 has been successfully translated and cross-culturally adapted from English to Kannada version. This study provides us with the evidence that the TSK-KA-11 is a reliable and valid measure to assess 'Fear of re-injury' in Kannada-speaking chronic musculoskeletal pain disorder patients. Thus, it can be used for assessing the risk of disability due to fear of re-injury in Kannada-speaking patients with chronic musculoskeletal pain disorders for both clinical and scientific purposes.

Ethical clearance taken from institutional ethical committee of Srinivas College of Physiotherapy and Research Centre, Mangalore

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