Translation, Cross-Cultural Adaptation, Reliability, and Validity of the Tamil Version of Fear-Avoidance Beliefs Questionnaire in Chronic Low Back Pain

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Abstract

Background: Excessive fear of movement, restricted physical activity, and cognitive distortions are frequently found with chronic low back pain (CLBP) subjects. The Fear-Avoidance Beliefs Questionnaire (FABQ) is the most well-founded and often used tool to measure fear and avoidance beliefs in CLBP subjects. In India, there is a diversity of culture, educational level, and language. So, there is a need to translate FABQ into the regional language Tamil, which will improve understanding of FABQ and reduce the language barrier of the Tamil population. **Objective:** To translate, cross-cultural adapt, and investigate the psychometric properties of the Tamil version of FABQ in CLBP subjects. **Materials & Methods:** The standard translation and adaptation guideline was used to translate FABQ into Tamil version FABQ. CLBP subjects referred to a low back rehabilitation program in an outpatient clinic took part in this study. They completed a FABQ-Tamil questionnaire [includes subscales for Physical Activity (FABQ-PA) and Work (FABQ-W)], pain rating visual analog scale and the Roland- Morris Disability Questionnaire (RMDQ)-Tamil version, on two occasions five days apart. Test-retest reliability, internal consistency and validity were evaluated. **Results:** Fifty CLBP subjects participated with a mean age of 39.94 (± 15.55) years. Convergent validity analysis displayed a moderate correlation between FABQ-PA and VAS (r = 0.63); FABQ-W and VAS (r = 0.64). Divergent validity analysis demonstrated a moderate correlation between FABQ-PA and RMDQ (r = 0.69) and a good correlation between FABQ-W and RMDQ (r = 0.85). The test-retest reliability was high; the intra-class correlation coefficients of FABQ-PA and FABQ-W were ICC-0.90 and 0.94, respectively. Cronbach's alpha for the FABQ-PA and FABQ-W were 0.87 and 0.92, demonstrating high internal consistency. **Conclusion:** The findings of this study demonstrated that the FABQ-Tamil version questionnaire is a reliable and valid measure of fear of pain and fear-avoidance beliefs in the Tamil-speaking CLBP subject.

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Acknowledgements

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ABSTRACT

Background: Excessive fear of movement, restricted physical activity, and cognitive distortions are frequently found with chronic low back pain (CLBP) subjects. The Fear-Avoidance Beliefs Questionnaire (FABQ) is the most well-founded and often used tool to measure fear and avoidance beliefs in CLBP subjects. In India, there is a diversity of culture, educational level, and language. So, there is a need to translate FABQ into the regional language Tamil, which will improve understanding of FABQ and reduce the language barrier of the Tamil population. **Objective:** To translate, cross-cultural adapt, and investigate the psychometric properties of the Tamil version of FABQ in CLBP subjects. **Materials & Methods:** The standard translation and adaptation guideline was used to translate FABQ into Tamil version FABQ. CLBP subjects referred to a low back rehabilitation program in an outpatient clinic took part in this study. They completed a FABQ-Tamil questionnaire [includes subscales for Physical Activity (FABQ-PA) and Work (FABQ-W)], pain rating visual analog scale and the Roland- Morris Disability Questionnaire(RMDQ)-Tamil version, on two occasions five days apart. Test-retest reliability, internal consistency and validity were evaluated. **Results:** Fifty CLBP subjects participated with a mean age of 39.94 (± 15.55) years. Convergent validity analysis displayed a moderate correlation between FABQ-PA and VAS (r = 0.63); FABQ-W and VAS (r = 0.64). Divergent validity analysis demonstrated a moderate correlation between FABQ-PA and RMDQ (r = 0.69) and a good correlation between FABQ-W and RMDQ (r = 0.85). The test-retest reliability was high; the intra-class correlation coefficients of FABQ-PA and FABQ-W were ICC-0.90 and 0.94, respectively. Cronbach's alpha for the FABQ-PA and FABQ-W were 0.87 and 0.92, demonstrating high internal consistency. **Conclusion:** The findings of this study demonstrated that the FABQ-Tamil version questionnaire is a reliable and valid measure of fear of pain and fear-avoidance beliefs in the Tamil-speaking CLBP subject.

Keywords: chronic low back pain, fear-avoidance belief questionnaire, reliability, validity.

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INTRODUCTION

Low back pain (LBP) is a localized pain above the gluteus inferior folds and below the costal margin, with or without referred leg pain. LBP that exceeds three months in duration or continues beyond the expected average recovery period is termed chronic low back pain (CLBP). Usually, the tissues surrounding the lower back region will heal within six to twelve weeks after injury.[1] LBP is the foremost cause of disability worldwide and occurs in all age groups irrespective of culture/lifestyle, affecting the quality of life, functional abilities, and work performance. The incidence and prevalence of LBP are roughly the same throughout the world.[2]

A systematic review of LBP claims that "LBP is a major dilemma throughout the world and is more common among females than males in the population aged 40-80 years."[3] A recent survey suggests that 632.045 million people suffer from low back pain worldwide.[4] CLBP is usually a complex entity influenced by physiological, psychological, and psychosocial factors.[1] This solid psychological overlay has been one of the causes of long-term absenteeism from work and job loss.[5] In clinical practice, pain-related fear and patient disability perception play a vital role in recovery. Therefore, addressing these aspects in a clinical setting helps to achieve successful outcomes and clinically meaningful improvement. In 1983, Lethem described pain-related fear and postulated "confrontation" and "avoidance" as the two extreme responses of fear found amongst individuals. Confrontation leads to functional recovery, and an avoidance attitude is believed to create further consequences related to physical and psychological issues, leading to a high pain perception. In the fear-avoidance model of exaggerated pain perception, pain and fear are linked with attitude through evasion learning.[6]

In 1993, Waddell developed the sixteen-item self-reported Fear-Avoidance Beliefs Questionnaire (FABQ) to evaluate individuals' perception and beliefs about physical activity and work affecting their low back pain.[7] The two subscales of physical activity (FABQ-PA) and work (FABQ-W) help identify the patient's assumptions about their LBP regarding their work and physical activity.[7] Among the two subscales, the work subscale has consistently been a reliable predictor of job loss and disability.[8] In the original study, items 1, 8, 13, 14 and 16 were not considered in the sum of the total score, though considered to be a part of the questionnaire.[7] Thus, the distribution of points on the subscale related to work should be carried out by adding the items 6, 7, 9, 10, 11, 12 and 15 (total score from 0 to 42 points) and the subscale related to physical activities by adding up the items 2, 3, 4 and 5 (total score from 0 to 24 points). The 16 questions are responded to on seven-point Likert scales ranging from strongly disagree to strongly agree.[11]

The original FABQ-English version has good psychometric properties and has proven its validity in predicting disability in activities of daily living and work loss[7]. Clinically, FABQ is the most promising screening tool and outcome measure for identifying fear of pain and avoidance belief among individuals at risk of prolonged disability. Those with high FABQ scores require a tailor-made intervention program to address those needs. Recent evidence suggests the need for a multi-disciplinary approach comprising graded exposure to physical activity and cognitive-behavioral therapy.[9] FABQ is the most widely used questionnaire in all western countries for evaluating fear-avoidance beliefs in chronic low back pain, neck pain and shoulder pain. The FABQ is not known to many because of misconceptions that the origin of the pain is always somatic. Even in geographical regions with a good literacy rate, people have trouble understanding English questionnaires, which then limits the use of several questionnaires as clinical assessment tools in physiotherapy settings.

India is a diverse country in terms of culture and language. Chennai is the capital of the Tamilnadu state in India. While the literacy rate there is 90.33 percent, English is always a foreign language. Tamil is India's most widely used language, spoken by 6.9 billion people. Language is a barrier in evaluating a CLBP patient with a self-administered FABQ questionnaire in English. To better understand the Tamil- speaking patients with CLBP, it would be preferable to have a questionnaire in Tamil that the patient can comprehend. Hence the present study aimed to translate the FABQ into Tamil, adapt cross-culturally, test reliability and validity, and analyse the psychometric properties of the FABQ-Tamil version.

METHODS

Participants: This prospective cross-sectional validation study included fifty chronic low back pain subjects referred to an outpatient physiotherapy department for rehabilitation. Subjects with a medical diagnosis of non-specific chronic low back pain aged between 30 and 60 years of both genders who could read and understand the Tamil language were enrolled. Subjects with a history of spine surgeries, a medical diagnosis of spinal infections or seronegative arthropathies, and who are illiterate were not included in the study. The requirement of a minimum number of fifty study subjects in studies involving questionnaire validation has been adhered to.[10] Institutional Ethical Committee clearance was obtained, and all subjects provided informed consent.

Procedure: Subjects received an explanation of the study objectives, and the self-report questionnaires were provided on two occasions within five days. The demographic details of age, gender, duration of symptoms, and education level were collected from the initial interview. Permission for translation and validation of FABQ-Tamil was obtained from the original author. The study was conducted in two phases.

Phase I: FABQ Translation and Cross-Cultural Adaptation Process
The translation of FABQ was performed following the guidelines of the Mapi Research Trust comprising the following stages[12]. In phase I, the original FABQ was translated into Tamil version FABQ, which includes four stages explained in detail as follows:

Stage One
Forward translation (English to Tamil) by a Tamil language expert: FABQ was translated into Tamil (D1) by a Tamil language expert along with two physiotherapists who were well-versed in the language.

Stage Two
Backward translation (Tamil to English) by an English teacher: Two independent translators with a postgraduate degree in English and one physiotherapist who was unaware of the back translation, then translated D1 into D2 (FABQ Tamil to English back-translation).

Stage Three
Analysis for accuracy and to establish the penultimate version of Tamil FABQ: This process was carried out by an expert committee where members were blinded as to the purpose of the study. Both translations (D1 and D2) were critically analyzed by an expert committee comprising eight members, namely one translator, two experts in the language (Tamil and English), one process moderator, one coordinator, two senior physiotherapists and one Professor. The committee checked the tool for consistency, cultural word adaptation and finalized the penultimate version of FABQ-Tamil. The investigator documented the whole process in detail, which included the expert committee members' experiences.

Stage Four
Pilot testing: Checking for the accuracy in translation of the Tamil version with the English version by administering the Tamil and English FABQ to a sample of 10 CLBP subjects: Those who could understand, speak, and write both Tamil and English equally well were recruited. The process demonstrated that none had difficulty understanding the newly translated FABQ Tamil version, and the tool was accepted as the final Tamil version of FABQ.

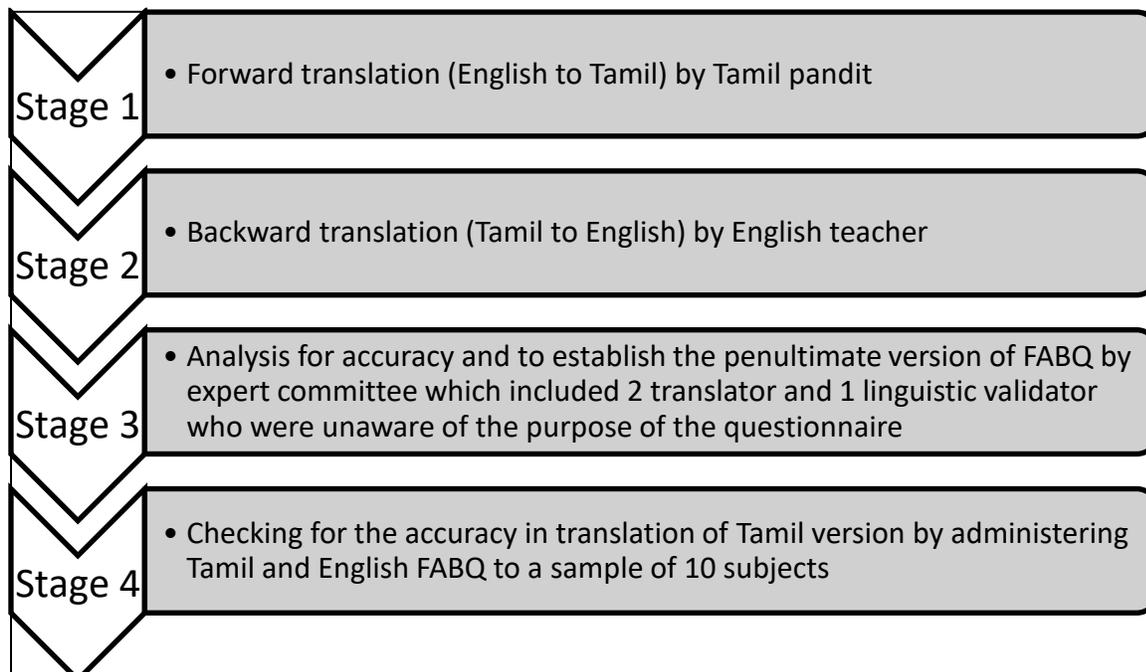| Stage 1 | • Forward translation (English to Tamil) by Tamil pandit |
Stage 2	• Backward translation (Tamil to English) by English teacher
Stage 3	• Analysis for accuracy and to establish the penultimate version of FABQ by expert committee which included 2 translator and 1 linguistic validator who were unaware of the purpose of the questionnaire
Stage 4	• Checking for the accuracy in translation of Tamil version by administering Tamil and English FABQ to a sample of 10 subjects

Figure 1: Stages of FABQ Translation process

Phase II: Testing reliability and validity of the Tamil version of FABQ
Fifty CLBP subjects were evaluated for pain severity using a visual analog scale[13] and percentage of disability using the Roland – Morris Disability Questionnaire (RMDQ)-Tamil version on day one. The RMDQ-Tamil is a self-administered tool in which larger numbers reflect significant levels of disability on a 24-point scale[14,15]. The FABQ-Tamil questionnaire was administrated on day one and on day five to analyze the test-retest reliability. Even though FABQ is a self-administered tool, the same researcher monitored the questionnaire administration and re-test evaluation. All questionnaires were administrated in paper format and the time taken for each was recorded.

Data Analysis:
The statistical package for SPSS version 17 was utilized for data analysis. The sample characteristics were expressed in descriptive and inferential statistics. Test-retest reliability was evaluated using the intraclass Correlation Coefficient (ICC). Interpretation of ICC are as follows: below 0.40 - poor; 0.40 to 0.75 - moderate; 0.75 to 0.90 - substantial; above 0.90 - excellent. Pearson's correlation coefficient assessed the validity in numerical scales. The relationships were interpreted as: strong correlation for r value above 0.60, the moderate correlation for r value between 0.30–0.60, and weak correlation for r value less than 0.30. Cronbach's alpha used to estimate internal consistency results numbers from 0 to 1. The general gold rule of thumb was >.70 good, >.08 better and >.90 best. Convergent validity was evaluated by correlating the FABQ-Tamil version with VAS for pain severity. Divergent validity was measured by correlating FABQ- Tamil version with RMDQ for disability. The significance level for statistical tests was set at <0.05.

RESULTS
The FABQ-Tamil validation study included 50 subjects (20 males and 30 females) reporting chronic low back pain with a mean age of 39.9 ± 15.5 and mean duration of symptoms 90.1 ± 154.3 in days. The average time taken by all participants was 6.5 ± 2.5 minutes. The mean pain severity (±SD) measured using visual analogue scale was 5.7 ± 1.8 score and mean functional disability (±SD) measured using RMDQ was 9.1 ± 4.2 score.

Reliability Testing: The results of the Reliability Testing are presented in Table 1. The test-retest reliability values of FABQ-Tamil subscales (FABQ-PA and FABQ-W) were intra-class correlation coefficients (ICC) of 0.90 and 0.94, respectively, and internal consistency Cronbach's alpha value was 0.87 and 0.92, respectively

Table 1. Test-Retest Reliability and Internal Consistency of FABQ Subscales

Characteristics	FABQ-PA	FABQ-W
Test	16.8 ± 5.4	23.0 ± 9.9
Retest	16.6 ± 5.5	23.1 ± 9.8
Mean difference	0.10	0.06
ICC (95% CI)	0.90 (0.79, 0.96)	0.94 (0.82, 0.98)
Cronbach's alpha	0.87	0.92

FABQ-PA-Fear Avoidance Belief Questionnaire-Physical Activity subscale, FABQ-W-Fear Avoidance Belief Questionnaire-Work subscale, ICC- Intraclass Correlation Coefficient, CI- Confidence Interval.

Validity Testing: The results of validity testing are presented in Table 2. A strong positive and significant relationship between the FABQ-W subscale and RMDQ (r-0.85) revealed a high correlation. However, a moderate correlation was observed between the FABQ-PA subscale and VAS (r-0.63) or RMDQ (r-0.69).

Table 2. Correlation between FABQ subscales and clinical variables

FABQ subscales	Clinical variables	Pearson correlation (r)	p value
FABQ [PA]	Pain severity (VAS)	0.63	0.00*
	Functional disability (RMDQ)	0.69	0.00*
FABQ [W]	Pain severity (VAS)	0.64	0.00*
	Functional disability (RMDQ)	0.85	0.00*
FABQ [PA]	FABQ [W]	0.21	0.13

FABQ-PA-Fear Avoidance Belief Questionnaire-Physical Activity subscale, FABQ-W-Fear Avoid Belief Questionnaire-Work subscale,
RMDQ- Roland- Morris Disability Questionnaire, VAS – Visual Analogue Scale * Significant at p< .05, Pearson correlation coefficient.

DISCUSSION

Questionnaires are an integral component in measuring outcomes, predicting diagnosis, and analyzing the prognosis of a clinical condition. The original version of FABQ is a simple, direct questionnaire for analyzing fear and avoidance behavior among the CLBP population. The Tamil version of FABQ exhibited good test-retest reliability, internal consistency, and validity. The correlation between FABQ subscales and clinical variables ranged from moderate to high. The face validity for the Tamil FABQ was good, as expressed by the expert committee members.

Few difficulties were translating the questionnaire from English to Tamil except that a few words like *"sarira sambandhamaana seyalgal"* were difficult for the subjects to understand; this was then changed to *"udal saarndha seyalgal,"* which conveyed the same meaning. Both the translators were keen on selecting correct words which would be easy to understand. The accents and slang of the language are many and two different words that convey the same meaning in the same context are used in other parts of the state. For example, the Tamil meaning for words like worse and bad was the same (*mosam*), which was meaningful and easy to understand. "*Normal work*" and "*regular work*" conveyed the same meaning, so an appropriate Tamil word was selected. All these modifications were taken into consideration before the pilot trial.

The cut-off physical activity and work subscale scores to prove fear beliefs and avoidance nature were above 15 and 34, respectively.[16,17] The mean subscale scores of the current study showed normal perception towards the work subscale and mild fear and avoidance towards physical activity[18]. The average pain severity was observed to be similar to the Brazilian version of FABQ.[18] The average degree of disability in the current study was mild to moderate, ranging from 1 to 20, depicting more significant variance among samples. The study findings of Woby et al were similar to those of the current study regarding disability status in the CLBP population.[19]

The internal consistency of the FABQ-Work subscale was observed to be higher than that of the physical activity subscale, and the finding is consistent with various reports[20-27]. The internal consistency of FABQ-W (ICC=0.94) was superior to the German (ICC=0.84), Italian (ICC= 0.89), Norwegian (ICC=0.82), Swiss-German (ICC=0.91), Greek (ICC=0.86), Chinese (ICC=0.84), Finnish (ICC=0.89), Arab (ICC=0.83) versions[20-27]. The internal consistency value of FABQ-PA (ICC=0.90) was superior to the German (ICC=0.64), Italian (ICC= 0.74), Norwegian (ICC=0.66), Greek (ICC=0.72), Chinese (ICC=0.78), Finnish (ICC=0.71), Arab (ICC=0.63) versions[20, 22-27] and consistent with the Swiss-German (ICC=0.91) and Portuguese (ICC=0.92) versions of FABQ.[21,30]

The highest level of test-retest agreement was observed Tamil version FABQ for the FABQ (W) subscale (Cronbach's alpha =0.92) and FABQ (PA) subscale (Cronbach's alpha = 0.87). When compared to questionnaires developed and tested in other languages,[20-27] the FABQ-Tamil exhibited higher test-retest reliability (0.90 to 1.00). The reasons for this result may be the test re-test reliability of the FABQ-Tamil was completed on day one and day five. Studies[21-25] that advocated test re-test reliability less than 48 hours duration showed the lesser value of ICC. These findings support that an optimal interval of more than 48 hours duration is required to test re-test reliability and get higher values of ICC[7]. Studies[21-25] reported that test re-test reliability measured less than 48 hours indicated moderate reliability. Moreover, the tool's educational status, level of understanding, and comprehension of study subjects were substantial factors in the achieved results. The Tamil version of the FABQ [FABQ (W) subscale (Cronbach's alpha =0.92); FABQ (PA) subscale (Cronbach's alpha = 0.87)] was more reliable valid than other Indian language versions of the FABQ Marathi [FABQ (W) subscale (Cronbach's alpha =0.82); FABQ (PA) subscale (Cronbach's alpha = 0.73)] and FABQ Hindi [FABQ (W) subscale (Cronbach's alpha =0.78); FABQ (PA) subscale (Cronbach's alpha = 0.78)] [28,29]. The Marathi and Hindi Version of FABQ showed poor to moderate ICC value and weak to moderate correlation. This Tamil version

of FABQ was found to be moderate to substantial ICC value with moderate to high correlation values. This study result shows that the Tamil Version of the FABQ is superior to other Indian versions[28,29] of the FABQ.

Construct validity was not possible in this study, as a similar construct of FABQ or a tool measuring fear towards movement was unavailable in Tamil. Hence, convergent and divergent validity was analyzed by comparing the subscales of the FABQ Tamil version with pain severity and functional disability (RMDQ). There was a weak correlation between the subscales of FABQ, suggesting that they are of different constructs. A moderate relationship exists between FABQ subscales and pain severity, reported in a recent study.[29] These findings indicate that the construct evaluated by FABQ is different from the clinical variables. Both Convergent validity and divergent validity in our study supported by strong correlations (r value greater than 0.60) and a very strong positive relationship (0.85) reported between the FABQ-W subscale and functional degree of disability was evident in relating fear avoidance and functional disability.[20] In accordance with Pfinngsten et al (2000), these results demonstrated a strong relationship between fear-avoidance beliefs and measures of disability. The reason for this strong correlation between FABQ, pain severity (VAS) and functional disability (RMDQ) could be following: Chronic low back pain causes increased pain intensity and reduced physical function. The reduced physical function creates fear of movements and work-related problems such as increased medical care-seeking, absenteeism from work, poor duty performance.[31,32] This could be the rationale beyond the strong relationship for functional disability (RMDQ) and pain severity (VAS) with FABQ.

Limitations, Strengths, and Recommendations for Future Research
The limitation of this study is that the outcome measures used were self-reported questionnaires, and objective clinical tests were not included. Moreover, the study was limited to one health sector and factor analysis was not performed as observed in other versions. The strength of the current study is that it adopted a five-day time period between the two points of measurement, exhibiting excellent test-retest reliability. Future studies may analyze the relationship between the validated FABQ-Tamil and physical measures and scales related to kinesiophobia. The Tamil FABQ proved to be a valid and reliable instrument for measuring fear of pain and fear-avoidance beliefs in chronic low back pain patients and can be effectively used in clinical practice.

CONCLUSION
The Tamil version of FABQ is a reliable and valid measure of fear of pain and fear-avoidance beliefs in the Tamil-speaking chronic low back pain population. FABQ-Tamil has adequate internal consistency, test-retest reliability, and construct validity comparable to the original English version. Thus, FABQ-Tamil exhibits sufficient psychometric properties to address the self-reported fear and avoidance beliefs in patients with chronic low back pain.

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