

ORIGINAL ARTICLE

The Marathi version of Revised Short Form of McGill Pain Questionnaire: Cross Cultural Adaptation and Psychometric Evaluation in patient with Osteoarthritis

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ABSTRACT

Patients in Maharashtra experience difficulties in understanding English questionnaires due to the language barrier. Patients find difficult to convey pain experience as majority of scales are in English, which is a major barrier in assessment and hence in the treatment. Therefore, objective of this study was to translate revised Short Form of McGill Pain Questionnaire-2 (SF-MPQ-2) into Marathi language and check its reliability and validity. The study was conducted in two stages: the first stage was formulation of a cross-culturally adapted Marathi version of the SF-MPQ 2 and the second stage was testing the psychometric properties. Psychometric evaluation of Marathi SF-MPQ 2 was done using face and content validity, convergent validity, test-retest reliability and Cronbach's alpha analysis on patients with OA. The results of present study shows that Marathi version of SF-MPQ-2 have high face and content validity. The Pearson coefficient for convergent validity was 0.995. For Test-retest reliability, the Pearson coefficient of Marathi questionnaire was 0.99. English and Marathi versions of the scale have Cronbach's Alpha values of 0.919 and 0.915, respectively. The Cronbach's Alpha values for the reliability analysis for the Marathi Version on day1 and Marathi Version on day 2 are 0.9951 and 0.9958 respectively. The present study concluded that Marathi version of SF-MPQ-2 can be considered a valid and reliable pain assessment tool in Marathi speaking patients with OA.

Key words: Cross Cultural Adaptation, Psychometric Evaluation, Marathi version of Revised Short Form of McGill Pain Questionnaire, Osteoarthritis

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INTRODUCTION

Osteoarthritis (OA) is chronic, slowly progressive, degenerative disease of joint which affects articular cartilage.[1] Clinically, the condition is characterized by joint pain, tenderness, crepitus, stiffness and limitation of movement with occasional effusion and variable degrees of local inflammation. In India, osteoarthritis affects 22% to 39% of people. The most common types of OA are hip and knee OA; the overall frequency of knee OA is 28.7%. [1][2]

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.[3] The most common OA symptom is pain, which is also the reason why people with the condition typically seek medical attention. Pain in OA originates from the densely innervated subchondral bone, periosteum, periarticular ligaments, periarticular muscle spasm, synovium, and joint capsule.[4][5][6]

Pain is a complex experience that differs greatly from person to person, even between those with similar injuries and/or illnesses. Pain can significantly impact your quality of life.[7] Pain assessment is critical to optimal pain management interventions. Pain is a highly subjective experience, only the person experiencing pain can describe how much pain they feel. [8]

There are numerous varieties of pain scales in use, each with unique advantages. A pain scale is a tool that healthcare providers use to help assess a person's pain.[9] They're helpful because pain is experienced

differently by different people and can vary greatly in severity and nature. Having a way to quantify your pain aids in the following areas:

- The diagnostic process
- Tracking the progression of a condition
- Determining how effective a treatment is.[9]

The scales can offer qualitative, quantitative, or both types of measurements. Quantitative scales are a simple way for people to rate the intensity of their pain. Quantitative measures include visual analog scales (VAS) and numerical rating scales (NRS). However, VAS and NRS did not take into consideration the different pain aspects or dimensions such as the psychological dimensions and the different types of pain. Therefore, it does not evaluate and capture the pain as a whole entity. On the other hand, McGill Pain Questionnaire (MPQ) assesses both quality and intensity of subjective pain.[9] [10]

McGill pain questionnaire (MPQ) is one of the most widely used multidimensional pain scale designed to measure the sensory, affective, evaluative aspects of pain and pain intensity in adults with chronic pain.[11] It appears in questionnaire form, consists of 78 words that describe pain and assesses a person's pain based on the words they use to describe their pain. It is time consuming tool.[11]

The short-form McGill Pain Questionnaire (SF-MPQ) is a shorter version of the original MPQ, has 15 words or items that describes sensory and affective component of pain. [12]

Dworkin et al. developed the revised short form of McGill pain questionnaire (SF-MPQ-2) in 2009 for the use in neuropathic and non-neuropathic pain conditions. SF-MPQ-2 used to assess quality as well as quantity of pain. There are 22 items in this edition that describe pain and have 0–10 numerical response possibilities.[13] The SF-MPQ-2 is used in OA as it asks about the pain experience in descriptive terms unrelated to functional activities.[14]

The term cross-cultural adaptation is used to encompass a process that looks at both language (translation) and cultural adaptation issues in the process of preparing a questionnaire for use in another setting.[15] Adaptation is aimed towards measuring a similar phenomenon in different culture and producing equivalent instrument adapted to another culture. [16] The process involves the adaptation of individual items, the instructions for the questionnaire, and the response options. [17]

Psychometrics is the construction and validation of instruments and assessing if these instruments are reliable and valid forms of measurement. Reliability and validity of the adapted tool is must, as few properties of the tool might have changed according to the changes in the items of tool. The capacity to reproduce a result consistently across time and space is known as reliability. The ability of an instrument to measure precisely what it promises is known as validity. [17] [20]

The SF-MPQ 2, originally published in English language and translated into many languages. There is no evidence of the SF-MPQ 2 questionnaire being translated into Marathi, which is a widely used language in the Maharashtra state of India. The primary objective of this study is to develop a version of the SF-MPQ 2 in native Marathi language that is cross-culturally adapted to suit Maharashtra population. Therefore, this study aims to translate and culturally adapt the Marathi version of the SF-MPQ 2 questionnaire and to validate it in Indian patients with OA. This will enable clinicians and researchers to assess patient's pain in their own cultural context with questions which are relevant and meaningful.

Need of the study

Maharashtra, the second-largest state in India by population (112,400,000), has made Marathi its official state language.[21] There are about 84,000,000 persons who identify as Marathi speakers. After Telugu and Hindi, Marathi is now the third most spoken language in India in terms of native speakers.[21] Patients in Maharashtra experience difficulties in understanding English questionnaires due to the language barrier.

Although the English version is available, an equivalent version of SF-MPQ 2 in Marathi would allow the patients to convey adequately about their pain experience to clinicians.

Before using Marathi version of SF-MPQ 2, which measures pain in patients and assesses the efficacy of treatments in Indian scenario, it should be validated for their use in the Indian sociocultural context for more accurate interpretation.

Therefore, cross-cultural adaptation, reliability testing and validation of the questionnaire, which is translated in Marathi regional languages, is essential for the questionnaire to be used in that particular region.

MATERIAL AND METHODS

The ethical clearance was obtained from Institutional Review Board. It is Cross cultural adaptation study. 93 patients were enrolled from the inpatient and outpatient physiotherapy department. Inclusion criteria were a native Marathi speaker and the patients had to be able to speak, read and write in Marathi and

English, diagnosed case of OA on radiography, age between 40 -75 years, joint pain due to osteoarthritis. Patients were excluded if they were not willing to participate, patients with cognitive disorder and with any underlying systemic disease

Outcome Measures

Short form McGill Pain Questionnaire 2 (SF-MPQ-2)

This questionnaire consists of 22 different descriptors of pain and each item is rated based on a 0-10 scale with 0 equal to no pain and 10 equals to the worst pain ever during the past week.

The subscale scores will be calculated by summing the numerical values of each item, and the total scores represented the sum of values for all 22 items. Higher subscale or total scale scores indicated patients with more intense symptoms.[7]

Validity- 0.43- 0.88

Reliability – 0.73 -0.90

Procedure

The study was conducted in two stages: the first stage was formulation of a cross-culturally adapted Marathi version of the SF-MPQ 2 and the second stage was testing the psychometric properties of the Marathi version of the SF-MPQ 2.

Translation and cross-cultural adaptation

After securing permission from the Mapi Research Trust [25], the English SF-MPQ 2 was translated into Marathi language following Guidelines for the Process of Cross-Cultural Adaptation by Beaton 2007, as given in figure 1.[9][10]

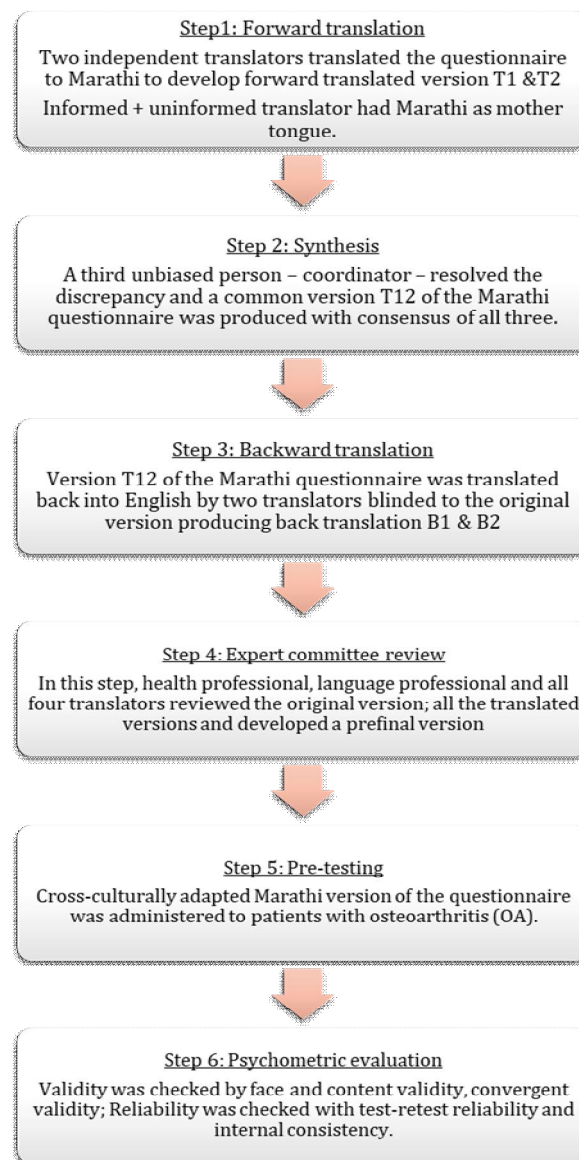


Figure 1: Stage 1- translation and cross-cultural adaptation

Psychometric evaluation

The final cross-culturally adapted Marathi version of the questionnaire was administered to patients with osteoarthritis (OA). The patients were enrolled after obtaining informed consent. To be eligible to participate in the study, the patients should be able to speak, read, and write in Marathi and English, be diagnosed case of OA. The psychometric assessment consisted of validity and reliability.

Testing of Psychometric properties

The final cross-culturally adapted Marathi version of the questionnaire was administered to patients with osteoarthritis (OA).

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The psychometric assessment consisted of validity and reliability.

Content and Face Validity

This validity is a qualitative form of validity that evaluates whether the expressions contained in the measuring instrument represent the phenomenon intended to be measured.

For determining content and face validity expert opinions was taken. Evaluation by more than one referee was done.

Qualified experts and academicians or practitioners (eight experts) evaluated each expression in the developed questionnaire and rate the questionnaire according to Likert scale.^{[24][38]} 80% consensus was obtained for the questionnaire to be valid.

Convergent Validity

Convergent validity takes two measures that are supposed to be measuring the same construct and shows that they are related.

For determining Convergent validity, participants were asked to fill the SF-MPQ 2 English and Marathi version both on the day of first visit. For this purpose, participants should have knowledge of both languages.

Decision of which version to give first to the participant was made by flipping the coin. For the head side English version was given first, vice versa for the tail side.

After filling the first questionnaire, another version was given to participant with gap of at least 2 hours between the administration. The Pearson correlation analysis was performed to compare the results.^{[24][34]}

Test-retest Reliability

Test-retest reliability refers to the consistency of a measure; hence, a test is considered reliable if we could get the same result repeatedly.

For this purpose, participants were asked to fill out the Marathi SF-MPQ-2 on their first study visit and 24 hours after the first visit.^[32]

The Pearson correlation analysis was performed to compare the results. This type of reliability assumes that there will be no change in the quality being measured across time.

Internal Consistency

The internal consistency of the measuring instrument depends on the correlation of each item that constitutes the measuring instrument and calculated using Cronbach alpha.^[32]

Bland Altman plot

A Bland Altman plot was intended to see if there is marked difference between two measures in terms of their prediction of common construct that is pain. It is scatter plot where the difference between two measurements are plotted against each other's average.^[39]

Statistical Analysis

Data was initially managed using Microsoft Excel (versions 6.2.14 for Excel 2019 and Excel 2021). Descriptive statistics were performed in Excel. Analysis for psychometric testing was conducted in SPSS (version 29) and Jupyter Notebook (version 7.1)

RESULTS

The Marathi version of SF-MPQ-2 was administered to 93 OA patients. The Age Distribution of Patients is given in Table 1.

Table no 1: Age Distribution of participant

Age Interval	No of Patient	Percentage
40-50	21	22.6%
51-60	26	28%
61-70	37	39.8%
71-80	9	9.7%
Total	93	

Gender Representation is given in Table 2.

Gender	No of Patient	Percentage
Male	28	30.1%
Female	65	69.9%
Total	93	

Table no 2: Gender Distribution of participant

The mean $\pm$ standard deviation scores of English SF-MPQ-2 and Marathi SF-MPQ-2 on day 1 and day 2 shown in Table 3

Stats	ENGLISH-1	MARATHI- 1	MARATHI- 2
No of Patient	93	93	93
Mean	66.10	65.60	63.58
SD	32.21	28.57	29.48

Table no 3: Mean and SD of English and Marathi SF-MPQ-2

The Marathi versions of the Revised Short Form of the McGill Pain Questionnaire-2 (SF-MPQ-2) show similar mean scores and slightly lower variability compared to the English version, suggesting good validity and reliability. However, MARATHI-1 is slightly more consistent and closer to the English version than MARATHI-2, which has a lower mean score and slightly higher variability. Both Marathi versions are promising, but MARATHI-1 may be slightly more reliable.

Psychometric Evaluation

Results of face and content validity - For determining face and content validity expert opinions (eight experts) was taken. In this study most experts agree that Marathi version of SF-MPQ-2 have high face and content validity, it appears to be relevant, clear and appropriate.

80% consensus was obtained for the questionnaire to be valid.

Results of Convergent validity- Correlation analysis between English and Marathi versions scores was done using Pearson correlation coefficient. The correlation between the total scores of the English and Marathi versions is approximately **0.995**, which indicates an extremely high positive correlation. This suggests that the Marathi translation of the SF-MPQ-2 is highly valid, as it closely reflects the construct measured by the original English version.

Results of test - retest reliability analysis-

The Pearson correlation coefficient between the scores from Marathi Day 1 and Marathi Day 2 is **0.9999**. This extremely high correlation indicates a very strong positive relationship between the two sets of scores. In other words, participants' responses on Day 1 are almost perfectly correlated with their responses on Day 2, suggesting that the test is highly reliable across the two days.

Results of Internal Consistency (Cronbach's Alpha) analysis-

The Cronbach's Alpha values for the reliability analysis for the English version and Marathi Version on day 1 are as follows:

English Version: 0.919

Marathi Version: 0.915

These values are quite high, indicating excellent internal consistency for both the English and Marathi versions of the scale.

The Cronbach's Alpha values for the reliability analysis for the Marathi Version on day 1 and Marathi Version on day 2 are as follows:

Day 1 (Marathi 1): 0.9951

Day 2 (Marathi 2): 0.9958

These values indicate excellent internal consistency for both Day 1 and Day 2 measurements, suggesting that the Marathi version of the questionnaire is highly reliable.

The Bland-Altman plot

The Bland-Altman plot shows the differences between the English and Marathi scores against their average.

The red dashed line represents the mean difference between the two scores.

The blue dashed lines represent the limits of agreement, which are typically set at ± 1.96 standard deviations from the mean difference.

Interpretation:

In this plot, most points fall within the limits of agreement, suggesting that there is generally good agreement between the English and Marathi versions, with no significant bias as shown in Figure 2.

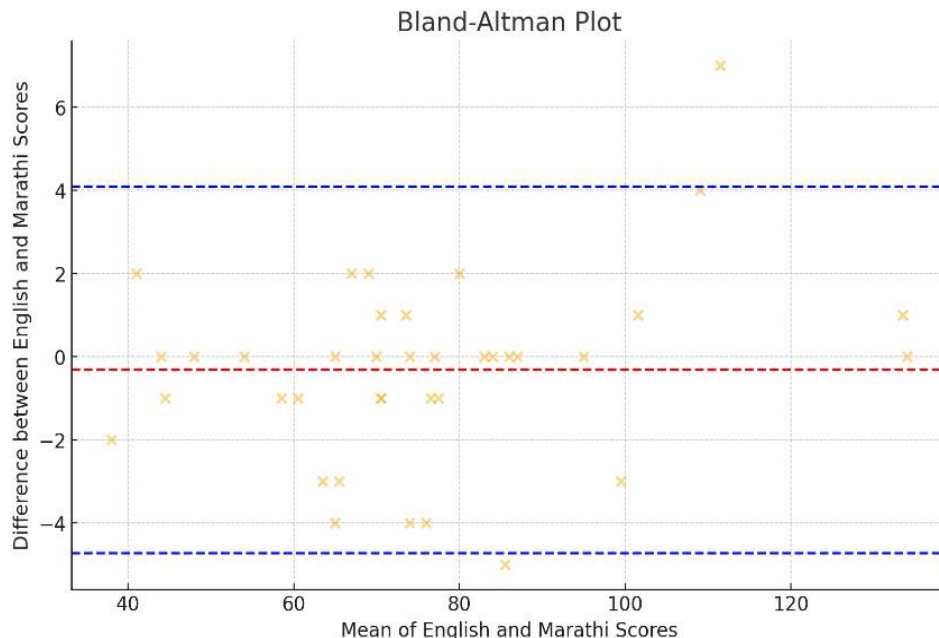


Figure 2 : Bland-Altman Plot

DISCUSSION

The cultural background can influence pain perception among people. It is usually observed in clinical practice that patients find difficult to convey pain experience as majority of scales are in English, which is a major barrier in assessment and hence in the treatment. [28]

In this study, aim was to translate SF-MPQ-2 questionnaire into Marathi language and to find out validity and reliability of Marathi version that can be used in patients with Osteoarthritis. The results of the present study revealed that this scale has excellent validity and reliability for the assessment of pain.

In this study, the majority of the patients fall within the 61-70 age group, representing approximately 40% of the total sample. This suggests that osteoarthritis is more prevalent or more severe in this age range among the sample studied.

The majority of the patients in the study are female, accounting for approximately 70% of the total sample. Males make up about 30% of the sample. This significant difference in gender distribution suggests that osteoarthritis is more prevalent or more severe among women in the population studied, or that women are more likely to seek treatment.

Face validity which is a qualitative analysis and it is valuable because they provide rich source of information that can tap into unexpected issues associated with individual item. Results of face and content validity are valuable as experts possess in depth knowledge and understanding of the construct to be measured. Also, they have hands on experience which enables them to measure relevance and acceptability.[24][38] In this study most experts agree that Marathi version of SF-MPQ-2 have high face and content validity, it appears to be relevant, clear and appropriate.

The approach used for validity testing was the correlation analysis between the total scores of the English and Marathi versions which indicated excellent convergent validity.[23][24] Assessing convergent validity with the original version helps establish construct equivalence. Construct equivalence is crucial because it refers to the degree to which a translated or adapted measure assesses the same theoretical construct or concept as the original measure. [23][24]

In terms of test -retest reliability, the Pearson correlation coefficient of Marathi questionnaire was 0.99. The 24-hr interval was chosen in the study as it was the most appropriate duration to measure reliability, and a longer interval between the tests would bias the results because true changes in pain in patients with OA receiving treatment would become more likely. [32]

The original English version of SF-MPQ-2 has demonstrated validity values 0.43- 0.88 and reliability 0.73 -0.90 which was assessed in individuals with diverse chronic pain syndromes and patients with painful diabetic peripheral neuropathy.[7] Current study showed comparatively higher values for validity and reliability of Marathi version of SF-MPQ-2 questionnaire.

A commonly accepted values of Cronbach's alpha for description of internal consistency is considered excellent for $\alpha \geq 0.9$. [32] Both the English and Marathi versions of the scale have Cronbach's Alpha values of 0.919 and 0.915, respectively suggesting that excellent internal consistency for both the English and Marathi versions of the scale. The Cronbach's Alpha values for the reliability analysis for the Marathi Version on day1 and Marathi Version on day 2 are 0.9951 and 0.9958 respectively suggesting that excellent internal consistency for both Day 1 and Day 2 measurements, and the Marathi version of the questionnaire is highly reliable.

The Bland-Altman plot suggests most points lie within the limits of agreement (between the blue lines), it indicates good agreement between English and Marathi versions.[39][40]

CONCLUSION

In this study null hypothesis is rejected and alternate hypothesis is accepted. Hence it is concluded that the Marathi version of SF-MPQ-2 can be considered a valid and reliable pain assessment tool in Marathi speaking patients with OA.

Clinical implication

The use of the Marathi version of SF-MPQ-2 can assist in comprehensive pain assessment aiding management and improved patient care in Maharashtra

Limitation

Inter-rater reliability which is assessed by applying the same instrument by two or more raters and comparing the responses was not done.

Future Scope

In this study Marathi version of SF-MPQ-2 was only checked for patients with OA. In future it can also be applied to other musculoskeletal condition and for which reliability and validity should be checked.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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Supplementary Document

1. English version of revised short form of McGill pain Questionnaire
[SF-MPQ-2 AU1.0 eng-GB 1.0.0 \(3\).docx](#)
2. Marathi version of revised short form of McGill pain Questionnaire
[Marathi final Version of SF-MPQ-2.docx](#)

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