



MARATHI TRANSLATION, CROSS-CULTURAL ADAPTATION, AND LINGUISTIC VALIDATION OF 'JAW FUNCTIONAL LIMITATION SCALE-8' IN YOUNG ADULTS

Physiotherapy

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ABSTRACT

The Jaw Functional Limitation Scale-8 is used to assess functional limitations related to the jaw in individuals. Reliability of the Marathi version of the Jaw Functional Limitation Scale-8 is crucial for determining its clinical applicability. **Objectives:** This study aimed to translate and validate the Jaw Functional Limitation Scale-8 (JFLS-8) into the Marathi scale (JFLS-8-M). The JFLS-8-M was developed by translating and cross-culturally adapting the English version of the JFLS-8, following the guidelines of Beaton. The study included 40 participants. The reliability of the JFLS-8-M was determined using internal consistency with Cronbach's alpha, while content validity was determined by considering seven experts using I-CVI and S-CVI/Ave. Individuals were asked to complete the Marathi version of the Jaw Functional Limitation Scale on two separate occasions, with a time gap of 7 days between the two administrations. The data collected from these administrations were then analysed using statistical techniques such as test-retest reliability and internal consistency measures to determine the reliability of the Marathi version of the Jaw Functional Limitation Scale-8. **Results:** Cronbach's alpha (internal consistency) for the total JFLS-8 Marathi score was >0.8 . The scale-level content validity index, calculated using the average method (S-CVI/Ave), indicated that an S-CVI/Ave value of ≥ 0.9 signified excellent content validity. The agreement was nearly perfect overall, with single-measure values exceeding 0.8, and the p-value was statistically highly significant ($p < 0.01$). **Conclusion:** This validation study presents a Marathi adaptation of the Jaw Functional Limitation Scale (JFLS-8) that demonstrates validity, reliability, and internal consistency, yielding results comparable to those of the original American-English version.

KEYWORDS

Temporomandibular Disorders, Jaw Limitation

INTRODUCTION

Proper jaw function is essential for activities such as chewing, speaking, and expressing emotions through facial movements. Dysfunction of the jaw can lead to considerable discomfort, pain, and reduced quality of life for those affected.

The Jaw Functional Limitation Scale-8 (JFLS-8) is the most commonly used self-reported questionnaire for temporomandibular joint disorders. This is a reliable and valid short form of the JFLS-20. The scale is an organ-specific outcome measure that targets movements around the temporomandibular joint. It comprises three constructs of the jaw: mastication, vertical jaw mobility, and emotional and verbal expression. It focuses on basal functions such as chewing, swallowing, eating, and yawning, and emotional components such as smiling, laughing, and kissing. (Aguilar et al., 2021) The scale, developed by Richard Ohrbach, employs a scoring system ranging from 0 to 5 for each item, with higher scores signifying increased limitations in jaw function. (The Jaw Functional Limitation Scale: Development, Reliability, and Validity of 8-Item and 20-Item Versions, 2007)

It is the Axis II tools of DC/TMD. (Schiffman & Ohrbach, 2016) (Ohrbach, 2020) The short version of the Jaw Functional Limitation Scale (JFLS) was developed to provide a concise assessment tool for evaluating functional limitations related to temporomandibular disorders (TMDs), while minimizing respondent burden and administration time. (Alrowaili, 2018) (Diagnostic Criteria for Temporomandibular Disorders (DC/TMD): Diagnostic Decision Tree Pain-Related TMD and Headache, n.d.) Typically, the short version consists of a subset of items selected from the original 20-item scale based on statistical analyses, clinical relevance, and psychometric properties.

The Jaw Functional Limitation Scale (JFLS) has been translated into several languages to facilitate its use in various linguistic and cultural settings. There is a need to translate this scale into regional languages. Marathi is the official language of Maharashtra, India, and is spoken by most people. According to the 2011 Census of India, Marathi speakers constitute approximately 83% of the population of Maharashtra. Hence, it was necessary to develop a Marathi version of the Jaw Functional Limitation Scale-8 [M-JFLS-8].

Need of Study

In clinical practice, the use of this scale is as important as clinical diagnosis. There are two types of scales: disease-specific scales and functional activity scales, which are generally used to provide an overview of impairments. The translation of any scale is essential to

enhance its acceptance among the general population and to achieve more accurate or optimal results. Self-administered tools should be easy to access and convenient for users who will employ them.

Being in a multilingual country, India, and residing in the 2nd largest state, Maharashtra, where Marathi is the primary language of communication, the scale should be available in the Marathi language.

Assessment of jaw function in young Marathi-speaking adults is important for cultural relevance, accurate diagnosis, early intervention, patient communication, and research purposes.

This study aimed to translate and develop a cross-culturally validated and reliable Marathi version of the Jaw Functional Limitation Scale-8 (JFLS-8).

METHODOLOGY

40 Young adults in the age group of 20-45 with Jaw limitation for the past 3 months.

This study was conducted in three phases. Phase I consisted of the translation of the English version of the JFLS-8 into the Marathi version. The second phase consisted of the cross-cultural validation of the JFLS-8 by oral medicine specialists and prosthodontists. The third phase of the study consisted of field testing the translated and validated version to check test-retest reliability and validity.

Phase I of this study was conducted according to Beaton guidelines. (Guillemin et al., 1993) The translation process involved the following stages.

- 1) Forward translation: Two translators translated the JFLS-8 into Marathi. Translator 1 (T1) was a Marathi teacher at the convent school. Translator 2 (T2) was the principal of the Marathi School.
- 2) Reconciliation of items: Discrepancies in both versions were addressed, and an agreement was reached on the T12 version by third reviewer.
- 3) Backward Translation: B1 and B2 were the backward translations of the T12 version. Two back translators who were blinded to the original version of the scale were involved in the process. One translator was an English teacher at a convent school, and the other was a computer engineer.
- 4) Review of the forward and backward translations: The review was designed to assess the entire forward-backward process to provide a final forward translation by two senior physiotherapists and one senior dentist.
- 5) Pre-test (cognitive interviews): The pre-test was intended to

determine whether all items were comprehensible and acceptable to the participants. Following this stage of the translation process, the Marathi version was well accepted by the Marathi-speaking community, except for the item that discriminated between vegetarians and non-vegetarians. The item was to chew chicken (चिकन चावा), which was a biased action for non-vegetarians in society. The suggestion to include a supplementary item (सोचनीन चकळणे) was made, and the discrepancy was addressed with these recommendations. For clarity, the consumption of soft foods that require minimal chewing, such as mashed potatoes, applesauce, pudding, and pureed food, was proposed. In Maharashtra cuisine, curd is used instead of apple sauce. An example has been added for further clarity: (उदा. दही, कुस्करलेला बटाटा). Following the pilot study, several modifications were made to the scale. Thereafter, the final version of the M-JFLS-8 was submitted for further deliberation and subsequently subjected to Field Testing among patients experiencing jaw movement limitation across five clinics.

Data were collected for 6 months. The patients who participated in the study were recruited from the private clinical multispecialty setup of the Mumbai and Navi-Mumbai Suburban areas and Thane region of Maharashtra. Eligible participants who fulfilled the inclusion criteria were enrolled in this study. Participants with Jaw Functional mobility limitation associated with pain in the past 3 months and who had not undergone any treatment were considered eligible.

Participants who were not ready to remain refrained from treatment for 1 week were excluded. This was essential because this part of the study aimed to evaluate the test-retest reliability of the final version of the M-JFLS-8. The final version of the JFLS-8 was administered to the 40 participants. A therapist provided the English and translated the Marathi version of the JFLS-8 to the patient. After a week, participants were given another blank copy of the final Marathi JFLS-8 version.

Content Validity: The final version of the Jaw Functional Limitation Scale-8 (JFLS-8) was submitted to a panel of seven experts in dentistry to evaluate its content validity. A recommendation was made to enhance the clarity of one item.

RESULTS:

40 participants were recruited for the study. Table 2 presents the percentage distribution of these participants, indicating that 19 individuals (45%) were female, and 21 individuals (55%) were male. The ages of the participants ranged from 19 to 40 years, with an average age of 23.95 years.

All the data were entered into a computer using a coding system and proofed for entry errors. The data obtained were compiled using an MS Office Excel Sheet. Data were subjected to Statistical Analysis using SPSS v 26.0, IBM.

Validity Testing:

During the translation validation stage, two analysis requirements were employed: the calculation of the score per item; and the calculation of the item-level content validity index (I-CVI) and scale-level content validity index (S-CVI), the latter calculated using the average calculation method (Scale level content validity index based on the average method - S-CVI/Ave), and the universal agreement method (Scale-level content validity index based on the universal agreement method - S-CVI/UA).

Expert validation was performed to obtain the results of the per-item score calculation. The translated version of the Jaw Functional Limitation Scale, the Marathi version, was sent to a panel of seven oral and dental specialists. The translated version received strong endorsement from the panel, and calculation of the item-level content validity index (I-CVI) and scale-level content validity index (S-CVI) demonstrated excellent content validity.

Table 1: Scale Index Validation.

	CVR		I CVI
	1.00		1.000
	1.00		1.000
	1.00		0.857
	1.00		1.000

	1.00		1.000
	1.00		1.000
	1.00		1.000
	1.00		1.000
Mean CVR	1.00	S CVI	0.982
	CVR: measures the essentiality of an item CVR varies between 1 and -1, and a higher score indicates greater agreement among panel members		S-CVI/Ave ≥ 0.9 have excellent content validity

Reliability Testing:

Comparisons of the scale in the Marathi language were performed by calculating the Cronbach's alpha coefficient as a measure of internal consistency for items comprising the respective domains. A Cronbach's alpha coefficient of 0.70 or higher is considered acceptable with a statistically significant difference (p<0.05).

Table 2: Intra-class correlations (ICC) & Cronbach's alpha.

Variable	Cronbach's Alpha	Intraclass Correlation	P value
Chew tough food	0.990	Single Measures	0.950 0.000*
		Average Measures	0.990 0.000*
Chew chicken	0.950	Single Measures	0.940 0.000*
		Average Measures	0.950 0.000*
Eat soft food requiring no chewing	0.920	Single Measures	0.900 0.000*
		Average Measures	0.920 0.000*
Open wide enough to drink from a cup	0.950	Single Measures	0.920 0.000*
		Average Measures	0.950 0.000*
Swallow	0.900	Single Measures	0.880 0.000*
		Average Measures	0.900 0.000*
Yawn	0.980	Single Measures	0.950 0.000*
		Average Measures	0.980 0.000*
Talk	0.920	Single Measures	0.890 0.000*
		Average Measures	0.920 0.000*
Smile	0.900	Single Measures	0.890 0.000*
		Average Measures	0.900 0.000*

Overall, the scale had excellent internal consistency (alpha > 0.9). There was an almost perfect agreement (single measures value >0.8) with a statistically highly significant p value (p < 0.01).

DISCUSSION

The current study aimed to develop a translation of the jaw functional limitation scale, along with cross-cultural adaptation and linguistic validation. The short form of the global functional limitation scale, the JFLS-8, includes major constructs of limitations in mastication, jaw mobility, and verbal and emotional expressions.

A shorter version of the JFLS-8 was chosen for the study as it provided a scoring for Global jaw functional limitation and helped save the valuable time of the patients and therapists. Five diagnostic groups were selected to represent the range of masticatory system dysfunction.

The content validity of these instruments is primarily based on item recommendations by specialists in oral medicine, pain, and prosthodontics.

The most challenging construct is mastication, which comprises all the movements related to preparing food for swallowing. Each type of food has its own consistency and texture, and different levels of chewing ability are required to form a bolus in preparation for swallowing.

Vertical Jaw mobility includes all movements associated with opening the jaw, and the range defined here is "wide enough to drink from a cup", "yawn." Of the items representing the emotional constructs/activities of the jaw, no coherent structures emerged. Only a few participants positively responded to the item regarding smiling.

The Cronbach's alpha coefficient values of the Marathi version were ≥ 0.9 for all the domains: chew tough food, chew chicken, eat soft food requiring no chewing (e.g., mashed potatoes, apple sauce, pudding, pureed food), open wide enough to drink from a cup, swallow, yawn,

talk, and smile. Cronbach's alpha showed excellent internal consistency for all domains and for all eight questions of the Marathi version of the Jaw Functional Limitation Scale-8 (JFLS-8).

CONCLUSION

In summary, this validation study contributes to the Marathi version of the Jaw Functional Limitation Scale (JFLS-8) that is valid, reliable, and internally consistent.

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Conflict of Interest: The authors declare no conflicts of interest related to this study.

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Ethics Declaration: Approval for the study was granted by the Institutional Review Board, and informed consent was obtained from all participants before their enrollment.

REFERENCES

1. Aguiar, A. D. S., Nogueira Carrer, H. C., de Lira, M. R., Martins Silva, G. Z., & Chaves, T. C. (2021). Patient-reported outcome measurements in temporomandibular disorders and headaches: Summary of measurement properties and applicability. In *Journal of Clinical Medicine* (Vol. 10, Issue 17). MDPI. <https://doi.org/10.3390/jcm10173823>
2. Alrowaili, A. (2018). Association Between Jaw Functional Limitation and TMD Diagnoses.
3. Diagnostic Criteria for Temporomandibular Disorders (DC/TMD): Diagnostic Decision Tree Pain-Related TMD and Headache. (n.d.).
4. Guillemin, F., Bombardier, C., & Beaton, D. (1993). Cross-cultural adaptation of health-related quality of life measures: Literature review and proposed guidelines. *Journal of Clinical Epidemiology*, 46(12), 1417–1432. [https://doi.org/10.1016/0895-4356\(93\)90142-N](https://doi.org/10.1016/0895-4356(93)90142-N)
5. Ohrbach, R. (2020). Diagnostic Criteria for Temporomandibular Disorders: Assessment Instruments. www.rdc-tmdinternational.org
6. Schiffman, E., & Ohrbach, R. (2016). Executive summary of the Diagnostic Criteria for Temporomandibular Disorders for clinical and research applications. *Journal of the American Dental Association*, 147(6), 438–445. <https://doi.org/10.1016/j.adaj.2016.01.007>
7. The Jaw Functional Limitation Scale: Development, Reliability, and Validity of 8-Item and 20-Item Versions. (2007).