

Title: Translation, Cultural Adaptation and Validation of the Facial Disability Index in Iranian patients with Bell's Palsy

Authors: Kamran Ezzati¹, Shadman Nemati², Alia Saberi³, Zoheir Reihanian³, Sajjad Rezaei^{4,*}, Kimia Esmaili⁵, Babak Bakhshayesh Eghbali³, Sara Hemmati⁵

- 1- Neuroscience Research Center, Trauma Institute, Guilan University of Medical Sciences, Rasht, Iran.
- 2- Otorhinolaryngology Research Center, Department of Otolaryngology and Head and Neck Surgery, School of Medicine, Amiralmomenin Hospital, Guilan University of Medical Sciences, Rasht, Iran.
- 3- Neuroscience Research Center, Trauma Institute, PourSina Hospital, Faculty of Medicine, Guilan University of Medical Sciences, Rasht, Iran.
- 4- Department of Psychology, University of Guilan, Rasht, Iran.
- 5- Guilan University of Medical Sciences, Rasht, Iran.

To appear in: **Physical Treatments**

Received date: 2025/11/22

Revised date: 2026/04/21

Accepted date: 2026/06/14

First Online Published: 2026/07/25

This is a “Just Accepted” manuscript, which has been examined by the peer-review process and has been accepted for publication. A “Just Accepted” manuscript is published online shortly after its acceptance, which is prior to technical editing and formatting and author proofing. *Physical Treatments* provides “Just Accepted” as an optional service which allows authors to make their results available to the research community as soon as possible after acceptance. After a manuscript has been technically edited and formatted, it will be removed from the “Just Accepted” Website and published as a published article. Please note that technical editing may introduce minor changes to the manuscript text and/or graphics which may affect the content, and all legal disclaimers that apply to the journal pertain.

Please cite this article as:

Ezzati K, Nemati S, Saberi A, Reihanian Z, Rezaei S, Esmaili K, et al. Translation, Cultural Adaptation and Validation of the Facial Disability Index in Iranian patients with Bell's Palsy. *Physical Treatments*. Forthcoming 2026. DOI: <http://dx.doi.org/10.32598/ptj.2026.787.1>
DOI: <http://dx.doi.org/10.32598/ptj.2026.787.1>

Abstract

Purpose: Bell's palsy is defined by the acute onset of unilateral facial weakness or paralysis, can significantly affect both physical functioning and emotional well-being. This study aimed to validate a culturally-adapted Persian version of the Facial Disability Index (FDI) for Iranian patients.

Methods: The FDI was prepared in Persian using a translation-back translation technique. In a cross-sectional analytical study conducted in 2024, 117 (80 men, 37 women) patients were consecutively recruited from PourSina Hospital's neurosurgery, neurology, intensive care, and physiotherapy departments in Rasht (northern Iran). The mean age of the patients and the duration of Bell's palsy were 44 years and 11 days, respectively. The participants completed the Persian versions of the FDI and the short-form Health Survey (SF-36), and the scores from both tools were correlated using Spearman's coefficient to determine concurrent criterion validity. Moreover, 40 other patients were assessed to ascertain the test-retest reliability and repeatability of the FDI over a one-week interval.

Results: The translation quality, including clarity, conceptual consistency, use of common language, and overall quality, was mainly favorable. The inter-rater reliability scores one week after admission for the Social Well-being and Physical Function subscales and the overall FDI were found to be excellent (ICC = 0.93 to 0.97). The internal consistency of the FDI for the total score and the subscales exceeded 0.90. Spearman correlation analyses revealed a moderate-to-strong positive relationship between the FDI dimensions and the physical and mental components of the SF-36 (0.51 to 0.93, $P < 0.01$).

Conclusion: The validated Persian FDI demonstrates robust psychometric properties, addressing a linguistic and cultural gap in assessment tools. It is a clinically suitable tool for reliably evaluating social well-being and physical in Iranian Bell's palsy patients, aiding treatment and rehabilitation monitoring.

Keywords: Facial disability, Bell's palsy, Questionnaire, Reliability, Validity.

Highlights

- Persian FDI demonstrated excellent test-retest reliability (ICC = 0.93–0.97).
- Internal consistency exceeded 0.90 for total and subscale scores.
- Moderate to Strong correlations ($r = 0.51\text{--}0.93$) with SF-36 physical and mental components.
- Persian FDI is a valid, reliable tool for assessing Bell's palsy impact in Iran.

Plain Language Summary

Bell's palsy constitutes a neurological disorder characterized by the acute onset of unilateral facial weakness or paralysis, thereby significantly impeding essential daily functions such as smiling, blinking, and articulation. It can also lead to emotional distress and social difficulties. To better understand how this condition impacts patients' lives, healthcare professionals often use questionnaires. One widely used tool is the Facial Disability Index (FDI), which asks patients about their physical challenges and how they feel in social situations. However, until now, there was no Persian (Farsi) version of this questionnaire that had been properly tested for use in Iran. In this study, we translated the FDI into Persian and checked whether it works well for Iranian patients with Bell's palsy. We asked 117 patients in Rasht, northern Iran, to complete the Persian FDI along with another well-known health survey. We also had 40 patients fill out the FDI twice, one week apart, to see if their answers stayed consistent over time. Our results showed that the Persian FDI is clear, easy to understand, and gives very consistent results. It also matched well with other measures of health and well-being, confirming that it captures real-life impacts of facial paralysis. This means doctors, physical therapists, and researchers in Iran can now use this tool to better assess how treatments affect their patients, encompassing not just physical, but also emotional and social dimensions. For patients, this is important because it helps healthcare providers design more personalized and holistic care plans. For the public and future health professionals, it supports more compassionate, effective rehabilitation that considers the whole person, not just their symptoms.

Introduction

Facial paralysis, most frequently manifested as Bell's palsy, represents a significant neurological burden with a reported lifetime likelihood of affecting roughly one in every 65 persons worldwide. Epidemiological data indicate a broad global prevalence spectrum, spanning from 11.5 up to 53.3 cases per 100,000 population (1), while previous regional surveys have documented a specific point prevalence of 2.15% within the Iranian context (2). Bell's palsy demonstrates no specific predilection for gender or age, with the highest incidence observed within the 15 to 50-year age range. While the precise etiology of the condition is not fully elucidated, its pathophysiology is associated with several factors, including autoimmune inflammatory responses, viral infections, inflammatory neuritis and microangiopathic ischemia (3).

Loss of facial motor control associated with Bell's palsy engenders considerable challenges in both daily functioning and social integration (4,5,6). Additionally, alterations in facial function and appearance can result in psychological distress and adversely impact self-image and quality of life (4,7,8,9). Assessing social well-being and quality of life through the patient's own lens is critical, given that subjective perceptions of one's social circumstances and psychological state often outweigh the objective severity of neuromuscular impairment.

The Facial Disability Index (FDI) constitutes a patient-reported outcome measure comprising 10 items, each evaluated using a six-point Likert scale. The measure includes two subscales: Physical Function and Social Function/Well-being, with scores ranging from 0 (indicating the worst outcome) to 100 (indicating the best outcome). The significance and applicability of the FDI lie in its specificity for facial activities, such as smiling and frowning. Since it first emerged in the 1990s, the FDI has been translated and validated in several languages, including Spanish (11), Dutch (12), Swedish (13), Italian (14), German (15), French (16), Turkish (17), and Brazilian Portuguese (18). However, earlier studies often failed to include a pilot phase (14, 15), pre-defined hypotheses for criterion validity (11, 13, 15, 16, 18), and an assessment of test-retest reliability (11, 15). Accordingly, the Persian translation of the FDI is essential; this process not only fosters a unified linguistic framework for Iranian rehabilitation professionals but also streamlines data acquisition and supports rigorous outcome-based studies concerning Bell's palsy. Additionally, no previous psychometric evaluation of the FDI has been conducted in Iran. This study seeks to translate and validate the FDI in Persian for use among patients with Bell's palsy.

Materials and Methods

An analytical cross-sectional research was conducted involving 117 patients admitted to the neurosurgery, neurology, intensive care, and physiotherapy departments at PourSina Hospital in Rasht, northern Iran, in 2024. A consecutive sampling method was adopted to recruit eligible patients. The participants were enrolled voluntarily and signed written informed consent forms.

The inclusion criteria comprised individuals aged 16 to 70 years who had been diagnosed with unilateral Bell's palsy (ranging from mild to severe) by a neurologist or ENT specialist. Exclusion criteria comprised patients with any significant neurological disorder (e.g., brain tumors, cerebrovascular accident, cerebral aneurysm, or other cerebrovascular events), those with head trauma involving depressed skull fracture, patients with psychiatric conditions such as severe depression (as documented in their mental health records), and individuals who declined to participate in the research for any reason. A total of 117 patients with Bell's palsy were evaluated at the time of admission and up to one week later to investigate the internal consistency and repeatability of FDI scores and the concurrent criterion validity. The requisite sample size for the present investigation was estimated based on the mean and standard deviation of FDI scores reported in a prior study on Bell's palsy patients (14). The sample size was calculated to be 106.57. This estimation was based on a standard deviation of 19, a 99% confidence level ($Z = 2.58$), and a permissible error of 4.75 (d^2), which represents one-fourth of the FDI score's standard deviation and a deviation of 4.75 points from the true mean (19). To enhance statistical precision and accommodate an anticipated attrition rate of 10%, the final sample size was adjusted upward to 117 participants.

$$n = \frac{Z^2 \cdot 1 - \frac{\alpha}{2} \cdot SD^2}{d^2} = \frac{(1.96)^2 \times (19)^2}{(4.75)^2} = 106.57$$

Final Sample size $106.57 + 10\% \text{ dropout} \cong 117$

Training of assessors and translation of the FDI

Before sampling, each of the four assessors (including two ear, nose, and throat [ENT] residents and two physiotherapy experts) underwent a training course consisting of five sessions and a minimum of 15 hours. The training focused on the effects of Bell's palsy on patients' facial recognition and movement, as well as the reliability and validity of the tests. Moreover, it included instruction on administering and interpreting FDI scores. The English version was initially translated into Persian by two researchers (forward translation). Subsequently, two translators independently translated the Persian version back into English (back translation). The principal investigator consolidated the four translated versions to create the final Persian version of the FDI. To assess the content validity and applicability of FDI's Persian version for patients with Bell's palsy, feedback was obtained from neurologists, neurosurgeons, ear, nose, and throat (ENT) specialists, psychologists, and physiotherapists at Guilan University of Medical Sciences. The Persian version of the FDI was finalized after their feedback was taken into consideration.

Research procedure

A sample of 40 patients with Bell's palsy was recruited through a convenience sampling method to evaluate the test-retest reliability of the FDI. The FDI was administered to participants to assess score consistency over time. After a one-week interval, eligible patients received a second assessment. A sample of 117 patients with Bell's palsy was recruited through non-probability

consecutive sampling to assess the internal consistency of the FDI. The concurrent criterion validity was evaluated by examining the correlations between FDI scores and those obtained from the 36-Item Short Form Health Survey (SF-36). All participants provided informed consent and filled out a demographic and clinical questionnaire that encompassed variables such as age, gender, level of education, marital status, and the primary reason for admission.

The 36-Item Short Form Health Survey (SF-36):

Weir et al. devised a 36-item instrument to assess quality of life, comprising two general measures of functioning: the Mental Component Summary (MCS), which scrutinizes the psychosocial dimensions of health, and the Physical Component Summary (PCS), which evaluates the physical aspects of health. The subscales are standardized on a scale from 0 to 100, with higher scores reflecting improved health status (20). The Health Survey demonstrates acceptable psychometric properties in Iran (21,22). In this study, the examiner orally administered all questions of the short-form Health Survey (SF-36) and documented the patient's responses to the questionnaire.

Statistical analyses

To evaluate the interrater reliability of the FDI, the Intra-class Correlation Coefficient (ICC) ($n=40$) was calculated employing a two-way mixed model with absolute agreement. The internal consistency of the FDI was examined via Cronbach's alpha ($n=117$). Concurrent criterion validity was established by correlating FDI scores with the primary dimensions of the SF-36, utilizing Spearman's rank correlation. All statistical procedures were executed using SPSS version 24.

Translation and adaptation

Development of the Persian FDI adhered strictly to the standardized linguistic validation protocol established by the International Quality of Life Assessment (IQOLA) project, ensuring semantic and conceptual correspondence (23). After the initial translation of the FDI scale was prepared by translators 1 and 2, two other translators (3 and 4) assessed and rated this version in terms of quality and difficulty. The evaluation scores for each item are displayed in the relevant tables. To ascertain the adequacy of the translation, raters evaluated the text across four distinct domains: clarity (use of simple, intelligible language), common language (absence of technical jargon), conceptual consistency (adherence to the original English version), and overall quality. Translators 3 and 4 independently scored each sub-component using a 100-point scale, with the average scores presented in the tables below (24, 25). The translators similarly assessed and scored translation difficulty, with mean scores displayed in the table. The inter-rater agreement for each sub-component was assessed by comparing the scores assigned by translators 3 and 4. Discrepancies greater than 15 points were indicated by a minus sign, reflecting disagreement, whereas differences of 15 points or less were indicated by a plus sign, reflecting agreement. Translations with a mean difficulty score of 25 or lower were categorized as "easy", while those with a mean quality score of 90 or higher were classified as "desirable." To classify scores near the

cut-off points, the terms "relatively desirable" and "relatively easy" were used for mean quality scores between 80 and 90 and mean difficulty scores between 25 and 30, respectively (26).

Accepted Manuscript (Uncorrected Proof)

Table 1: Descriptive Findings from the Evaluation of the Quality and Difficulty of Translating the Questions in the Persian Version of FDI

Questions number	Questions	Mean translation difficulty	Agreement in the translation difficulty	Translation difficulty	Mean translation clarity	Agreement in the translation clarity	Translation clarity	Mean common language	Agreement in the common language	Translation common language	Mean conceptual equivalence	Agreement in the conceptual equivalence	Translation conceptual equivalence	Mean general quality	Agreement in the general quality	Translation general quality
1	How much difficulty did you have keeping food in your mouth moving food around in your mouth or getting food stuck in your cheek while eating?	34	-	difficult	91.5	+	desirable	89	-	R d*	89	-	R d*	88	-	R d*
2	How much did you have drinking from a cup?	14.5	+	easy	98.5	+	desirable	98.5	+	desirable	99	+	desirable	99	+	desirable
3	How much difficulty did you have saying specific sounds while speaking?	18	+	easy	100	+	desirable	100	+	desirable	99	+	desirable	100	+	desirable
4	How much difficulty did you have with your eye tearing excessively or becoming dry?	34	-	difficult	91.5	+	desirable	89	-	R d*	89	-	R d*	88	-	R d*
5	How much difficulty did you have with brushing your teeth or rinsing your mouth?	15	+	easy	96	+	desirable	96.5	+	desirable	97	+	desirable	37	+	desirable
6	How much of the time have you felt calm and peaceful?	13.5	+	easy	97.5	+	desirable	98	+	desirable	99	+	desirable	98	+	desirable
7	How much of the time did you isolate yourself from people around you?	34	-	difficult	91.5	+	desirable	89	-	R d*	89	-	R d*	88	-	R d*
8	How much of the time did you get irritable towards those around you?	14	+	easy	94.5	+	desirable	97.5	+	desirable	96.5	+	desirable	97	+	desirable
9	How often did you wake up early or wake up several times during your nighttime sleep?	14	+	easy	95.5	+	desirable	89.5	-	R d*	95.5	+	desirable	34.5	+	desirable
10	How often has your facial function kept you from going out to eat shop or participate in family or social activities?	17	+	easy	96.5	+	desirable	98.5	+	desirable	98.5	+	desirable	98	+	desirable

*Relatively desirable, + Agreement, - no Agreement

Table 1 displays data derived from calculations based on the finalized Persian version of the FDI. The translation and adaptation process entailed iterative development. Initial versions exhibited suboptimal translation quality, especially in specific instructions and responses, with some instances of insufficient translation. The researchers re-evaluated items with poor translation quality and revised them using alternative lexical items, phrases, and sentences proposed by translators 1 and 2. These modifications were then submitted to translators 3 and 4 for assessment. The procedure was repeated iteratively until the translation quality of the Persian version attained a satisfactory and acceptable standard, with average scores surpassing the desired threshold. For this purpose, joint meetings were held with translators 3, 4, 5, and 6 and the researchers of the present study. Except for a few minor cases that did not affect the quality of the translation, the initial Persian version was finalized and approved. Once the final Persian version was reached, the translation and adaptation stage was completed, and the study entered the next stages.

Column 5 of Table 1 indicates that the translators evaluated most items as easy to translate. Subsequently, a high-quality translation was attained; therefore, this version was employed in the following stages of the translation process, specifically the back-translation phase. This stage involved rendering the text back into English by two native English-speaking translators who were highly proficient in Persian-to-English translation. The English version was derived from the original Persian text and compared with the initial English version to ensure conceptual consistency. Joint meetings were conducted with translators 3, 4, 5, and 6, alongside the researchers. Ultimately, the primary Persian draft achieved final approval, given that the residual minor discrepancies were inconsequential to the translation's qualitative standards. The finalization of the Persian version marked the completion of the translation and adaptation stage, and the study moved on to the next stages.

Demographic findings

A total of 117 patients aged 16 years and above, diagnosed with Bell's palsy, was evaluated. The mean duration of illness for these individuals was 11 days. Table 2 summarizes the demographic profile of the study participants. Of the 134 patients evaluated, 17 were excluded: 10 for lack of time and 7 for non-participation in the second evaluation session. Consequently, data were gathered from the Persian version of the FDI scale involving 117 patients: 80 women (68.4%) and 37 men (31.6%). The mean age of the patients was 44.32 ± 12.03 years.

Table 2: Demographic Information of Patients with Bell's Palsy (n=117)

Characteristics		n	%
Gender	Male	80	68.4
	Female	37	31.6
Affected Side	Right	83	70.9
	Left	34	29.1
Smoking	No	99	84.6
	Yes	18	15.4
Cause of BP	Non-traumatic	90	76.9
	Traumatic	27	23.1
Medication Use	No	104	88.9
	Yes	13	11.1
Type of Medication	Acyclovir	91	77.8
	Other Medications	26	22.2
Physiotherapy	No	104	88.9
	Yes	13	11.1

The descriptive statistics and Kolmogorov–Smirnov test outcomes are summarized in Table 3 to examine the score distributions for every test administered, along with the FDI and SF-36 values obtained from patient data. A significance level greater than 0.05 indicates that the variable's distribution adheres to the normality assumption.

Table 3: Descriptive Indices and Results of the Kolmogorov–Smirnov Test for Demographic Characteristics and FDI and SF-36 Tests (n=117)

Variables	Min	Max	Mean	SD	K-S p-value
Age (years)	16	70	44.32	12.03	0.75
Height (meters)	1.50	1.88	1.65	0.07	0.30
Weight (kilograms)	58	103	88.57	9.03	0.63
Body Mass Index (BMI)	21	37	24.1	6.95	0.0001
Duration of Illness (days)	2	35	11.62	5.02	0.50
Physical Function: FDI Subscale	13	90	39.34	23.78	0.043
Social Well-being: FDI Subscale	0	65	22.81	15.87	0.053
FDI Total Score	14	77	31.07	19.03	0.16
SF-36: Physical Component Summary	20	99	59.01	18.59	0.025
SF-36: Mental Component Summary	22	89	52.31	12.81	0.009

Internal consistency reliability

The internal consistency of the Physical Function subscale, the Social Well-Being subscale, and the overall FDI score was found to be excellent, with Cronbach's alpha coefficients calculated at 0.98, 0.96, and 0.97, respectively (n=117).

Assessment of Criterion Validity

The Physical Function and Social Well-being subscales, along with the total FDI score, demonstrated significant correlations with the Physical Component Summary scores of the SF-36 ($r_s = 0.93, 0.78, \text{ and } 0.90$, respectively; $p < 0.0001$). Furthermore, these measures yielded significant associations with the Mental Component Summary scores of the SF-36 ($r_s = 0.51, 0.60, \text{ and } 0.57$, respectively; $p < 0.0001$). All correlations were in the expected directions (n = 117).

Test–retest reliability

The test–retest reliability of FDI's Persian version was assessed by administering the questionnaire to 40 patients on two occasions, with a one-week interval between administrations. Pearson's correlation analysis demonstrated a statistically robust positive association between the two score sets for the Physical Function subscale ($r = 0.96$, $p < 0.0001$), the Social Well-being subscale ($r = 0.92$, $p < 0.0001$), and the FDI total score ($r = 0.95$, $p < 0.0001$).

Repeatability upon multiple administrations:

Table 4 displays the ICC results used to determine inter-rater reliability based on the total scores of the Persian version of the FDI. The scores were derived from two administrations of the instrument, with a maximum interval of one week between them. Repeatability is typically classified as follows (28): excellent (0.90–0.99), good (0.80–0.89), moderate (0.70–0.79), and weak (≤ 0.69). The calculated coefficients in the current study significantly exceed the established acceptable threshold, indicating excellent repeatability for the Persian FDI.

Table 4: ICC Values for the Total Score of the Persian Version of FDI with a One-Week Interval (n=40)

Scores	M $\pm$ SD	M $\pm$ SD	ICC
	Time 1	Time 2	
Physical Function: FDI Subscale	36.14 $\pm$ 24.43	39.34 $\pm$ 23.78	0.97
Social Well-being: FDI Subscale	19.44 $\pm$ 16.15	22.81 $\pm$ 15.87	0.93
FDI Total Score	27.78 $\pm$ 19.48	31.07 $\pm$ 19.03	0.95

Discussion

There is limited information in Iran on outcome measurement tools for neurological patients, especially those with Bell's palsy. The findings revealed that translating the items and developing the Persian version of the FDI was generally straightforward. The Persian translation was deemed largely satisfactory, particularly regarding its clarity, adherence to standard linguistic conventions, conceptual coherence, and overall quality. In selecting and employing lexical items, phrases, and sentences, the design team made considerable efforts to minimize ambiguous, unfamiliar, opaque, or equivocal expressions, thereby facilitating the translation of the instrument's text into another language. This advantage is clearly reflected in the current study. Four translators engaged in the project, each with adequate proficiency and experience in English-to-Persian translation, quantitatively confirmed the ease and satisfactory quality of the translation process. This procedure was repeated iteratively until the Persian translation met a satisfactory and acceptable standard, with the average score exceeding the desired threshold. Existing literature on translated versions of the FDI also supports this observation (11–18). Consequently, the simplicity and high quality of the Persian translation, along with the considerable number of FDI translations available worldwide, can be regarded as further indicators of its utility (25).

The Persian adaptation of the FDI exhibited robust internal consistency, characterized by Cronbach's alpha coefficients surpassing 0.90 across both the Physical Function and Social Well-being subscales, as well as for the total score. The test–retest reliability was evaluated by administering the instrument to 40 patients with a one-week interval. The ICC results were

high: 0.96 for Physical Function, 0.92 for Social Well-being, and 0.95 for the total score, confirming excellent temporal stability. Similarly, inter-rater reliability was also high, with ICCs above 0.90 for the total score across two independent ratings within the same period. These results indicate that the Persian FDI measures a unidimensional construct and yields consistent scores over time and across different raters. The current psychometric outcomes are congruent with the body of literature concerning FDI adaptations across various languages, including prior investigations conducted in English (10), Swedish (13), Italian (14), Dutch (12), and Turkish (17), all of which have underscored the instrument's reproducibility. The alignment of these psychometric parameters with international benchmarks reinforces the notion that the FDI construct remains stable and valid irrespective of linguistic or cultural translation. The strong psychometric properties of the Persian FDI underscore its importance as a reliable and valid patient-reported outcome measure. It enables the sensitive assessment of both functional limitations and psychosocial impacts in Persian-speaking patients with facial palsy, thereby directly supporting the primary aim of this study: to provide a linguistically and culturally adapted tool for evaluating the effectiveness of therapeutic and rehabilitative interventions in this population.

These psychometric findings indicate that the FDI effectively captures constructs that are theoretically aligned with the physical and mental health domains of the SF-36. Consequently, this research substantiates the concurrent criterion validity of the FDI, findings that are consistent with expected relationships and corroborated by previous research (van Swearingen et al., 2010 (10); Marsk et al., 2013 (13); Ozden et al., 2017 (17)). Nevertheless, it is crucial to acknowledge that these findings are specific to patients with acute, hospitalized unilateral Bell's palsy. Therefore, caution should be exercised when extrapolating these validity metrics to assess physical function and social well-being in other etiologies of facial palsy, as the psychometric performance may vary across different clinical populations.

Conclusion

In conclusion, this study fulfilled its aim of cross-culturally adapting and validating the FDI for Persian-speaking patients with Bell's palsy. It bridged a notable gap by introducing the first linguistically and culturally appropriate patient-reported outcome measure in Persian for evaluating the physical and psychosocial dimensions of facial paralysis. The adapted instrument exhibited favorable psychometric properties, including high reliability and established concurrent validity with a generic health survey. These results support the clinical utility of the Persian FDI as a sound tool for application in Iranian healthcare practice and research. Its adoption can aid clinicians in assessing therapeutic impact, tracking rehabilitative progress, and facilitating comprehensive, patient-focused management of Bell's palsy.

Ethical Considerations

Compliance with ethical guidelines

The study protocol received ethical approval from the Ethics Committee of Guilan University of Medical Sciences, located in Rasht, Iran (Code: IR.GUMS.REC.1402.503). Strict adherence to all ethical principles governed this study. Participants received comprehensive disclosure regarding the research objectives and procedural methodologies. Participants were firmly assured of data confidentiality and maintained the right to withdraw from the study at their own discretion. Participants were further advised that study findings would be provided to them upon request. Written informed consent was obtained from all participants; for those under the age of 18, consent was obtained from their parents or legal guardians.

Acknowledgment

We extend our gratitude and appreciation to all colleagues at the Neuroscience Research Center and the Trauma Research Center of Guilan University of Medical Sciences, as well as the colleagues in the inpatient wards, physiotherapy, and neurology departments of PourSina Hospital.

Financial support and sponsorship

Guilan University of Medical Sciences in Rasht, Iran, provided the funding for this investigation.

Conflicts of interest

No potential conflicts of interest were disclosed by the authors.

AI Tool

We acknowledge the use of DeepSeek AI (<https://www.deepseek.com>) for grammatical editing and language refinement of certain sentences in this manuscript.

Disclaimer

The researchers wish to thank the original developers of "The facial disability index" instrument. The translated version was used solely for the non-commercial, scientific purposes of this study.

References

- 1-Boahene KD. Etiology, epidemiology, and pathophysiology of post-facial paralysis synkinesis. In Management of post-facial paralysis synkinesis 2022 Jan 1 (pp. 13-17). Elsevier. <https://doi.org/10.1016/B978-0-323-98678-6.00002-1>
- 2-Movahedian B, Ghafoornia M, Saadatnia M, Falahzadeh A, Fateh A. Epidemiology of Bell's palsy in Isfahan, Iran. *Neurosciences Journal*. 2009 Apr 1;14(2):186-7. <https://doi.org/10.17712/nsj.2009.2.20090032>
- 3-Kim SY, Oh DJ, Park B, Choi HG. Bell's palsy and obesity, alcohol consumption and smoking: A nested case-control study using a national health screening cohort. *Sci Rep*. 2020;10(1):1-8. <https://doi.org/10.1038/s41598-020-71932-9>
- 4-Vargo M, Ding P, Sacco M, Duggal R, Genther DJ, Ciolek PJ, Byrne PJ. The psychological and psychosocial effects of facial paralysis: A review. *Journal of Plastic, Reconstructive & Aesthetic Surgery*. 2023 Aug 1;83:423-30. <https://doi.org/10.1016/j.bjps.2023.05.001>
- 5-Kim JH, Fisher LM, Reder L, Hapner ER, Pepper J. Speech and communicative participation in patients with facial paralysis. *JAMA Otolaryngol-Head Neck Surg*. 2018;144(8):686. <https://doi.org/10.1001/jamaoto.2018.0649>
- 6-Moverare T, Lohmander A, Hultcrantz M, Sjogreen L. Peripheral facial palsy: Speech, communication and oral motor function. *Eur Ann Otorhinolaryngol Head Neck Dis*. 2017;134(1):27. <https://doi.org/10.1016/j.anorl.2015.12.002>
- 7-Pouwels S, Beurskens CH, Kleiss IJ, Ingels KJ. Assessing psychological distress in patients with facial paralysis using the Hospital Anxiety and Depression Scale. *Journal of Plastic, Reconstructive & Aesthetic Surgery*. 2016;69(8):1066-71. <https://doi.org/10.1016/j.bjps.2016.04.006>
- 8-Weir AM, Pentland B, Crosswaite A, Murray J, Mountain R. Bell's palsy: the effect on self-image, mood state and social activity. *Clin Rehabil*. 1995;9(2):121-5. <https://doi.org/10.1177/026921559500900207>
- 9-Bruins TE, van Veen MM, Werker PM, Dijkstra PU, Broekstra DC. Associations between clinician-graded facial function and patient-reported quality of life in adults with peripheral facial palsy: a systematic review and meta-analysis. *JAMA Otolaryngology-Head & Neck Surgery*. 2021 Aug 1;147(8):717-28. <https://doi.org/10.1001/jamaoto.2021.1265>
- 10-Van Swearingen JM, Brach JS. The facial disability index: Reliability and validity of a disability assessment instrument for disorders of the facial neuromuscular system. *Phys Ther*. 1996;76(12):1288-300. <https://doi.org/10.1093/ptj/76.12.1288>
- 11-Gonzalez-Cardero E, Infante-Cossio P, Cayuela A, Acosta-Feria M, Gutierrez-Perez JL. Facial disability index (FDI): adaptation to spanish, reliability and validity. *Med Oral Patol Oral Cir Bucal*. 2012;17(6):1006. <https://doi.org/10.4317/medoral.17763>
- 12-van Veen MM, Bruins TE, Artan M, Mooibroek-Leeuwerke T, Beurskens CH, Werker PM, Dijkstra PU. Health-related quality of life in facial palsy: translation and validation of the Dutch version Facial Disability Index. *Health and Quality of Life Outcomes*. 2020 Dec;18:1-8. <https://doi.org/10.1186/s12955-020-01563-1>
- 13-Marsk E, Hammarstedt-Nordenvall L, Engstrom M, Jonsson L, Hultcrantz M. Validation of a swedish version of the facial disability index (FDI) and the facial clinimetric evaluation

- (FaCE) scale. *Acta Otolaryngol.* 2013;133(6):662–9. <https://doi.org/10.3109/00016489.2013.766924>
- 14-Pavese C, Cecini M, Camerino N, et al. Functional and social limitations after facial palsy: Expanded and independent validation of the italian version of the facial disability index. *Phys Ther.* 2014;94(9):1327–36. <https://doi.org/10.2522/ptj.20130254>
- 15-Volk GF, Steigerwald F, Vitek P, Finkensieper M, Kreysa H, Guntinas-Lichius O. Facial disability index and facial clinimetric evaluation scale: Validation of the german versions. *Laryngorhinootologie.* 2015;94(3):163–8. <https://doi.org/10.1055/s-0034-1381999>
- 16-Barry P, Mancini J, Alshukry A, Salburgo F, Lavieille J, Montava M. Validation of french versions of the facial disability index and the facial clinimetric evaluation scale, specific quality of life scales for peripheral facial palsy patients. *Clin Otolaryngol.* 2019;44(3):313–22. <https://doi.org/10.1111/coa.13294>
- 17-Özden F, Karaman ÖN, Tuğay N, Savaş Ö, Sözen T, Üçüncü H. The reliability and validity of the Turkish version of the Facial Disability Index. *Disability and rehabilitation.* 2020:1-10. <https://doi.org/10.1080/09638288.2020.1817989>
- 18- Graciano AJ, Bonin MM, Mory MR, Tessitore A, Paschoal JR, Chone CT. Translation, cultural adaptation and validation of the facial disability index into brazilian portuguese. *Braz J Otorhinolaryngol.* 2019. <https://doi.org/10.1016/j.bjorl.2019.04.003>
- 19- Malek-Afzali H, Majdzadeh R, Fotouhi A, Tavakoli S. [Methodology of applied research in medical sciences]. Tehran: Tehran Medical Sciences University Publications; 2005, pp: 295-316. [Persian] [Link]
- 20-Ware Jr JE, Sherbourne CD. The MOS 36-item short-form health survey (SF-36): I. Conceptual framework and item selection. *Medical care.* 1992;473-83. <https://doi.org/10.1097/00005650-199206000-00002>
- 21-Rezaei S, Khaksari Z. Validity and Reliability of the Short Form Health Survey Questionnaire (SF-36) for Use in Iranian Patients With Traumatic Brain Injury (TBI). *Iran J Neurosurg* 2019; 5 (2) :79-91. <http://irjns.org/article-1-181-en.html>
- 22-Montazeri A, Goshtasebi A, Vahdaninia M, Harirchi I. The Short Form Health Survey (SF-36): translation and validation study of the Iranian version. *Qual Life Res.* 2005;14(3):735-40. <https://doi.org/10.1007/s11136-004-1084-5>
- 23-Aaronson NK, Acquadro C, Alonso J, Apolone G, Bucquet D, Bullinger M, et al. International quality of life assessment (IQOLA) project. *Qual Life Res.* 1992;1:349-351. <https://doi.org/10.1007/BF00435634>
- 24-Bullinger M, Alonso J, Apolone G, Leplège A, Sullivan M, Wood-Dauphinee S, et al. Translating health status questionnaires and evaluating their quality: The IQOLA Project approach. *J Clin Epidemiol.* 1998;51(11):913-23. [https://doi.org/10.1016/S0895-4356\(98\)00045-2](https://doi.org/10.1016/S0895-4356(98)00045-2)
- 25-Drukker M, Kaplan C, Feron F, Van Os J. Children's health-related quality of life, neighbourhood socio-economic deprivation and social capital. A contextual analysis. *Soc Sci Med.* 2003;57(5):825-41. [https://doi.org/10.1016/S0277-9536\(03\)00067-3](https://doi.org/10.1016/S0277-9536(03)00067-3)
- 26- Iglesias CP, Birks Y, Nelson EA, Scanlon E, Cullum NA. Quality of life of people with venous leg ulcers: A comparison of the discriminative and responsive characteristics of two generic and a disease specific instruments. *Qual Life Res.* 2005;14:1705-18. <https://doi.org/10.1007/s11136-005-1747-9>

27- Koo TK, Li MY. A guideline of selecting and reporting intraclass correlation coefficients for reliability research. J Chiropr Med. 2016;15(2):155-63. <https://doi.org/10.1016/j.jcm.2016.02.012>

Accepted Manuscript (Uncorrected Proof)