

Translation and Validation of the Bengali Version of the NEI VFQ-25: A Pilot Study

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Introduction

Vision-related quality of life (VRQoL) is an essential aspect of health assessment, particularly in individuals with visual impairment. The National Eye Institute Visual Function Questionnaire-25 (NEI VFQ-25) is a widely recognized and psychometrically validated instrument designed to measure the influence of visual disability and symptoms on quality of life across multiple domains, such as near and distance activities, social functioning, mental health, dependency, and role difficulties ^[1]. It has been translated and culturally adapted into several languages worldwide, ensuring its relevance and applicability in diverse populations.

Despite its global reach, a formally validated Bengali version of the NEI VFQ-25 has been lacking. This is significant, considering that Bengali is the sixth most spoken language in the world, with over 230 million native speakers, primarily in India (West Bengal, Tripura, Assam) ^[2] and Bangladesh ^[3]. A substantial proportion of this population is at risk for or already experiencing vision impairment due to cataracts, diabetic retinopathy, glaucoma, and other age-related conditions. To ensure equitable health care and accurate quality-of-life measurement, tools like the NEI VFQ-25 must be linguistically and culturally tailored for such large linguistic groups.

This pilot study aimed to bridge this gap by creating and validating a Bengali version of the NEI VFQ-25 through comparative analysis with its original English counterpart.

Methods

A forward and backward translation process was conducted to ensure semantic and conceptual equivalence. I translated the NEI VFQ-25 into Bengali and it was independently reviewed by two bilingual medical professionals for linguistic and cultural accuracy. A backward translation into English was then carried out by a separate bilingual expert unfamiliar with the original instrument, to confirm consistency with the source version.

10 Bengali-speaking adults with varying degrees of visual impairment, fluent in English, were selected for this cross-sectional pilot study conducted between December 2024 and January 2025.

Inclusion criteria were adults aged 18 years or above, native Bengali speakers, and diagnosed with cataract, glaucoma, diabetic retinopathy (DR), or similar vision-threatening conditions. Exclusion criteria included any cognitive impairments or history of ocular surgery within the past three months, to avoid confounding recovery-related factors.

Participants completed both the Bengali and English versions in a randomized order to minimize bias. Internal consistency was assessed using Cronbach's alpha, and test-retest reliability was evaluated through Intraclass Correlation Coefficient (ICC). Construct validity was measured via Pearson's correlation between visual acuity and composite scores. Additionally, Rasch analysis was employed to assess item fit, response scale functionality, and person separation reliability.

Results

Table 1: Summary of Psychometric Properties – Bengali vs. English NEI VFQ-25

Psychometric Measure	Bengali Version	English Version
Cronbach's Alpha (Internal Consistency)	0.92	0.91
ICC (Test-Retest Reliability)	0.89 (p < 0.001)	0.87 (p < 0.001)
Pearson Correlation with Visual Acuity	r = 0.78 (p < 0.01)	r = 0.76 (p < 0.01)
Average Composite Score (out of 100)	61.3 ± 9.8	62.7 ± 10.1

These results suggest that the Bengali version preserved the reliability and validity of the English NEI VFQ-25 while being culturally appropriate and easy for participants to understand. Slight variation in composite scores was statistically insignificant, indicating equivalency in measurement.

Rasch Analysis Outcomes

Rasch modelling was used to evaluate the structural validity of the Bengali version. All items demonstrated acceptable fit statistics, and the response categories functioned appropriately.

Table 2: Rasch Analysis Summary – Bengali NEI VFQ-25

Rasch Metric	Bengali Version Outcome
Person Separation Index (PSI)	2.63
Person Reliability	0.88
Item Reliability	0.93
Mean Square Infit Range	0.82-1.21
Category Functioning	Ordered and Monotonic

The Rasch analysis results indicate that the Bengali version of the NEI VFQ-25 has a robust measurement structure. A Person Separation Index above 2.0 and Person Reliability over 0.8 confirm that the tool can effectively distinguish between varying levels of visual function among participants. The Item Reliability of 0.93 shows that the items consistently measure the intended construct. All items fall within the acceptable mean square infit range (0.7–1.3), reflecting a good fit to the Rasch model. Lastly, the ordered and monotonic category functioning suggests that response options were interpreted and used correctly by participants, affirming the scale's clarity and usability in Bengali.

Discussion

The Bengali version of the NEI VFQ-25 demonstrated strong psychometric properties closely mirroring the original English version, including excellent internal consistency ($\alpha = 0.92$) and high test-retest reliability (ICC = 0.89). These values are comparable with other language versions validated globally, such as the Chinese ($\alpha = 0.90$)^[4], Hindi ($\alpha = 0.91$)^[5] adaptations. Rasch analysis further confirmed the structural validity and measurement precision of the

Bengali instrument, supporting its ability to differentiate vision-related quality-of-life levels within the population. The ordered functioning of response categories indicated that participants clearly understood and used the response scale as intended. The strength of this pilot study lies in its methodological rigor despite a small sample size. Larger studies are needed to determine normative values and extend the tool's application to diverse Bengali-speaking populations across age, literacy, and clinical groups.

Conclusion

This study presents the first validated Bengali version of the NEI VFQ-25, providing a reliable and valid instrument for assessing vision-related quality of life in Bengali-speaking individuals. It retains the psychometric strength of the original English version, making it suitable for both clinical use and research. Future studies should expand on this foundation to further establish generalizability and responsiveness to treatment interventions.

References

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