

Adaptation and validation of Overall Anxiety Severity and Impairment Scale (OASIS) in Bangla

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Summary

Anxiety disorders cast a significant shadow over individuals' lives, affecting their physical, psychological, and social well-being. Several types of anxiety disorders are prevalent in Bangladesh. Using a disorder-specific scale for screening each anxiety disorder would be unwise in a busy healthcare setting. Recognizing the need for an effective screening and assessment tool for anxiety in the Bengali-speaking population, a cross-sectional validation study spanning from October 2018 to February 2023 successfully adapted and validated the overall anxiety severity and impairment scale (OASIS) for Bangla-speaking adults. OASIS is one of the shortest available anxiety screening tools and can assess multiple anxiety disorders within a short time. This ground-breaking study, conducted at the National Institute of Mental Health (NIMH) with approval from the Institutional Review Board (IRB), followed a meticulous adaptation process that included forward and backward translations, synthesis, and pilot testing. Clinically diagnosed 150 adults with anxiety disorder from the outpatient department who were administered an adapted version of OASIS, the Generalized Anxiety Disorder Scale 7 (GAD 7), and the WHO 5 wellbeing index (WHO-5) to assess the reliability and validity of OASIS Bangla version and data were analyzed using statistical package for social sciences (SPSS) 23 and classical and Bayesian instrument development (CBID) software. A significant strong positive correlation ($r=0.861$) was found between OASIS and GAD-7 which suggested strong convergent validity. Likewise, a strong negative correlation ($r=-0.837$) between OASIS and WHO-5 suggested strong divergent validity. Internal consistency measured by Cronbach's alpha found was 0.834 and split-half reliability measured by Spearman Brown Coefficient found was 0.836. Confirmatory factor analysis of the proposed one-factor model had a chi-square/df value of less than 3; Root mean square error of approximation (RMSEA) value of 0.073; comparative fit Index (CFI) value of 0.997 and Tucker Lewis index (TLI) value of 0.994. An exploratory factor analysis by principal component analysis method with varimax rotation identified one factor with eigenvalues more than 1.0 and it explained 60.8% of the variance. All five items had factor loads of more than 0.60 and the final analysis yielded a single component. When the results were considered as a whole, the OASIS Bangla was found a valid and reliable tool to assess anxiety severity along with impairment for Bangladeshi people.

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Introduction

Globally 33.7% population suffer from anxiety disorders during their lifetime which were found to be highly comorbid with each other, other psychiatric disorders and physical health conditions.¹ In Europe anxiety disorders are the most common mental illness with a prevalence of 14% among adolescents and adults.² During the corona virus induced disease (COVID) 19 pandemic, the prevalence of anxiety was found 41.3% in the South Asian subcontinent, where Bangladesh and Pakistan had higher rates.³ In Bangladesh's national mental health survey 2019, anxiety disorders were the second most common diagnosis where

prevalence was 4.7%.⁴ Anxiety disorders are important not only because of their high prevalence but also because of their impact on an individual's physical, psychological, and social functions. A study on chronically ill patients in Bangladesh found that 22% had definite anxiety symptoms.⁵

The Overall Anxiety Severity and Impairment Scale (OASIS) developed by Sonya Norman and her co-workers, is a five-item general instrument for anxiety measurement that assesses the frequency, severity, behavioral, and impairment aspects of anxiety symptoms.⁶ This scale is one of the most widely used

and the shortest among the existing anxiety scales.⁷ It is also one of the scales recommended by the American Psychiatric Association (APA) for assessing and monitoring anxiety patients.⁸ One of the advantages is it can be used across various anxiety disorders, comorbidity with anxiety disorder, and sub-syndromal anxiety states.⁶

As there is inadequate provision of psychiatric services at the primary health care level in Bangladesh, tools like OASIS could help immensely. Adapting and validating such tools was necessary for ensuring mental health services at different levels of healthcare and also for research purposes. This study was aimed at adapting the scale for Bangladeshi culture and assessing the psychometric properties of the newly adapted tools.

Materials and methods

This cross-sectional validation study was done in the psychiatry outpatient department of the National Institute of Mental Health (NIMH), Bangladesh from October 2018 to February 2023. The study was conducted complying with the declaration of Helsinki in 1964. The research protocol was approved by a review committee of the NIMH, Dhaka on 28 October 2018. The adaptation process was done following standard Beaton guidelines.⁹ The OASIS questionnaire was translated into Bangla by two persons having competency in both Bangla and English. Two translations were synthesized into one translation. This part was translated back to English by two other persons having competency in both Bangla and English. Based on the review committee, a pre-final version of the questionnaire was produced. Ten bilingual individuals of both Bangla and English languages filled up both versions of the questionnaire. Pearson's correlation test was done to see the strength of the association between Bangla-adapted versions and the original English version. After finalization, 15 adult persons from the study area were pretested. Then the final version of OASIS Bangla was submitted. Considering Comrey and Lee's opinion we decided to balance our sample between poor and good to 150.¹⁰ 18-year-olds or more, who could understand Bangla, who gave informed written consent, and who were clinically diagnosed as different types of anxiety disorders by consultant psychiatrist of the outpatient department, were included purposively. OASIS Bangla along with GAD 7 and WHO 5 well-being index Bangla adapted version were applied to assess convergent and divergent validity respectively. OASIS Bangla is a one-dimensional, self-reported five-item instrument asking about the frequency, severity, and effect on functioning of a wide range of anxiety symptoms over the past week. Total scores can range from 0 to 20, with higher scores being indicative of higher degrees of anxiety.⁶ The Bangla-validated GAD 7 questionnaire is a self-administered 7-item scale designed to assess the presence of the symptoms of

GAD.¹¹ Bangla validated WHO 5 Wellbeing Index is a 5-item scale to measure the psychological well-being of the individual. The raw score ranges from 0 to 25, with 0 representing the worst possible and 25 representing the best possible well-being.¹² Data was collected anonymously and confidentiality of data was ensured. After proper coding and cleaning, reliability was assessed by item-total correlation, and internal consistency by Cronbach's α calculation, a value of $\alpha=0.7$ was considered acceptable.¹³ Split-half reliability which was measured by the Spearman-Brown coefficient by dividing the items into two halves. Face validity was detected by the review committee along with some lay persons during finalizing the Bangla version. The content validity index measured content validity.¹⁴ Construct validity was assessed by confirmatory factor analysis and exploratory factor analysis (EFA) of the principal component with varimax rotation.¹⁵ Kaiser-Meyer-Olkin (KMO) measures sampling adequacy and Bartlett's test of sphericity was applied to assess the fitness of data for factor analysis. In Convergent validity, the degree of correlation between the OASIS Bangla scale and the GAD 7 was measured by Pearson's correlation coefficient. Likewise, divergent validity was calculated to compare between the OASIS Bangla scale and the WHO 5 Wellbeing Index.¹⁶ Statistical analysis was performed using statistical package for social sciences (SPSS) for Windows version 23 as well as *classical* and *Bayesian instrument development (CBID) software*.

Results

During the translation process, the OASIS Bangla version showed a strong positive correlation ($r=0.91$) when both English and Bangla forms were applied to bilingual individuals. We observed that the item-total correlation for Item 2, Item 4, and Item 5 showed strong positive correlations (between 0.60-0.79) while Item 1 and Item 3 showed moderate positive correlations (0.40-0.59), hence, the decision was taken to keep all the items (Table 1).

Internal consistency measured by Cronbach's alpha found was 0.834 (Table 2) and split-half reliability measured by Spearman-Brown Coefficient found was 0.836 (Table 3).

Face validity was detected by the review committee during the systematic development of OASIS Bangla. The content validity index of OASIS Bangla showed item-CVI more than 0.79 for each item which indicated that reviewers felt no further revision of the item was required. S-CVI/Ave value was 0.966 which indicated excellent content validity of OASIS Bangla (Table 4).

For assessing construct validity during confirmatory factor analysis, a one-factor model like the original scale was proposed and found that the chi-square/df value was less than 3, RMSEA value of 0.073, CFI value of 0.997, and TLI value of 0.994. All values suggested OASIS Bangla had a single-factor structure consisting of five items (Table 5).

Table 1: Distribution of item characteristics of OASIS Bangla

Item	Mean	SD	Item-total correlation coefficient	Cronbach's alpha if the item is deleted
Frequency of anxiety	2.61	0.89	0.580	0.802
Intensity of anxiety symptoms	2.44	0.83	0.634	0.790
Degree of avoidance due to anxiety	2.19	1.14	0.462	0.848
Work/school/home interference	2.05	0.95	0.765	0.748
Social life/relationship interference	1.92	0.95	0.721	0.761
Total	11.20	3.69	-	-

Table 2: Internal consistency as measured by Cronbach's alpha

Reliability statistics	Coefficient value
Cronbach's alpha (standard)	0.834
Cronbach's alpha (unstandardized)	0.825

Table 3: Split-half reliability of OASIS Bangla

Item*	Mean	SD	Cronbach's alpha	Spearman-Brown coefficient
Part 1	7.24	2.20	0.631	0.836
Part 2	3.97	1.78	0.847	

*Part 1 was Items 1, 2, and 3; Part 2 was Items 4 and 5

Table 4: Content validity of OASIS Bangla

Item	Number of very relevant response	Item-CVI
Frequency of anxiety	6	1
Intensity of anxiety symptoms	6	1
Degree of avoidance due to anxiety	6	1
Work/school/home interference	6	1
Social life/relationship interference	5	0.83

Table 5: Goodness of fit indicators of confirmatory factor analysis of OASIS Bangla

OASIS Bangla	Chi-square	df	p value	Chi-square/df	RMSEA	CFI	TAG
Full sample	9.003	5	0.109	1.800	0.073	0.997	0.994

df: degrees of freedom; RMSEA: Root mean square error of approximation; CFI: Comparative fit index; TLI: Tucker Lewis index

For exploratory factor analysis, the KMO was found 0.816 ($p < 0.001$) which was adequate. The communalities of OASIS Bangla between the items before and after extraction was above 0.3 in all items and was not needed to drop any item. Principal component analysis showed that all the items were loaded on a single factor. The lowest factor load found was 0.615 for Item 3 (Table 6).

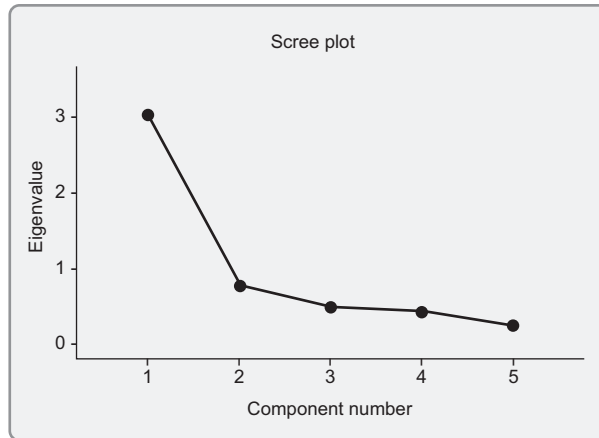
Scree plot analysis of the OASIS Bangla version showed a single component with eigenvalues 3.04 which was more

than 1 (one). This single component in total explained 60.8% of the variance (Figure 1).

The convergent validity of OASIS Bangla was measured by correlating it with GAD 7 ($r = 0.861$; $p = 0.000$) and was found significant positive correlation while the divergent validity of OASIS Bangla was measured by correlating with WHO 5 ($r = -0.837$, $p = 0.000$) found a strong negative correlation, both correlations confirmed the convergent and divergent validity of OASIS Bangla (Table 7).

Table 6: Component matrix of OASIS Bangla obtained by varimax rotation

Item	Factor 1	Extracted communalities
Frequency of anxiety	0.748	0.560
Intensity of anxiety symptoms	0.786	0.618
Degree of avoidance due to anxiety	0.615	0.378
Work/school/home interference	0.875	0.766
Social life/relationship interference	0.847	0.718
Percentage of variance explained	60.80%	

**Figure 1: Scree plot analysis of OASIS Bangla****Table 7: Pearson correlation coefficient between OASIS Bangla score and GAD 7 and WHO 5**

Measure	Pearson's correlation coefficient	p value
GAD 7	0.861	0.000
WHO5	-0.837	0.000

Discussion

The present study sought to explore whether the OASIS Bangla was an effective measure of frequency, severity, behavioral, and impairment aspects of anxiety or anxiety disorders in the context of Bangladeshi culture. We found that the OASIS Bangla could be considered both a global measure of severity and impairment associated with anxiety. The Beaton scale adaptation procedure is a well-established method for adapting health-related questionnaires for use in different cultures or languages.⁹ Following the development of the OASIS Bangla scale according to the Beaton procedure, both the Bangla and English version was applied to 10 bi-linguistics individuals. Their scores on both Bangla and English versions of the test were correlated by Pearson's product-moment correlation test and a value of $r=0.91$ was obtained which indicates a strong positive correlation between Bangla and English versions of the test. We also

pretested the scale on 15 individuals to determine whether there was any difficulty in wording or understanding of the items. All these steps and rigorous processes made the scale adaptation scientifically valid which resulted in a linguistically and culturally accurate instrument.

The items with an item total correlation value of 0.30 or higher are defined to represent similar behaviors and the internal consistency of the test is high.¹⁷ Cronbach alpha values of more than 0.70 were considered as the reliability level for instruments that could be used in research.¹³ The reliability of the scale was sufficient. Internal consistency as measured by Cronbach's alpha was 0.834 which indicated sufficient reliability. During the original scale development, Cronbach's alpha for the five items of the OASIS was 0.80. The Dutch version found it as 0.91¹⁸ while the Spanish version reported 0.86.¹⁹ Split-half reliability as measured by the Spearman-Brown coefficient was 0.836 which suggested both halves of the scales were highly consistent with each other. Mikoska in their Czech version reported a similar strong coefficient value.²⁰ I-CVI values range from 0 to 1. Zamanzadeh proposed that if $I-CVI > 0.79$, the item was relevant, between 0.70 and 0.79, the item needed revisions, and if the value was below 0.70 the item was eliminated.²¹ Similarly, if $S-CVI/Ave e > 0.9$ then the scale had excellent content validity¹⁴ and OASIS Bangla fulfilled both of these criteria. On confirmatory factor analysis, we proposed a factors model like the original scale and found that the chi-square/df value was less than 3; RMSEA value of 0.073; CFI value of 0.997, and TLI value of 0.994.²² All these values suggested OASIS Bangla had a single factor structure consisted of five items. Mikoska also reported a single-factor structure with chi-square/df of 3.20, $p < 0.525$, CFI = 1.00, TLI = 1.00, and RMSEA = 0.²³ However, in the US population the single-factor model did not meet other criteria for good model fit, $\chi^2(5)=39.12$, $p < .001$; RMSEA = .14.⁷ They felt when a diverse population was used model fitness might be decreased for OASIS. Campbell-Sills while analyzing OASIS structure found a single factor with eigenvalues >1 and for the unreduced correlation matrix, it was 3.19 (next highest eigenvalue=0.66). In that validation study, all five items displayed salient loadings on the latent factor (range=.61 to .78).⁷

In our study, on exploratory factor analysis a single factor was identified as having an eigenvalue of more than 1.0 (i.e., 3.04) and this single factor explained 60.8% of the variance. Our factor loading was between 0.61 and 0.87 for all five items. In the original validation study, all items were loaded on a single factor (eigenvalue 2.73, loadings 0.71-0.77) and they accounted for 55% of the variance.⁶ On convergent validity assessment we found OASIS Bangla correlated strongly and significantly with GAD 7 scale score. The high convergent validity of OASIS Bangla with GAD 7 further strengthened the validity of the scale. Convergent validity was reported with scales of similar constructs like brief symptom inventory 18 ($r=0.58$), fear questionnaire ($r=0.41$), and Spielberger trait anxiety questionnaire ($r=0.62$).^{6,16} On divergent validity assessment, we observed OASIS Bangla was negatively and strongly correlated with the WHO 5 well-being index score.¹⁶ Hermans and his colleagues also found strong divergent validity with the quality of life scale, the EuroQol (EQ-5D), and with the Connor-Davidson Resilience Scale.¹⁸ Overall, the resulting instrument, known as the OASIS Bangla, was believed to be a reliable and valid tool for assessing anxiety in Bangladeshi individuals and this study highlighted the importance of considering cultural differences when adapting psychological instruments for use in different populations.

Conclusion

Overall, the psychometric properties of OASIS Bangla were sufficient to meet the scientific requirements for use as a screening and measurement tool for anxiety symptoms in Bangladeshi adult individuals. However, some of the findings differed from other validation studies conducted in general population or primary care settings. It could be because of cultural differences in perceiving anxiety symptoms and associated impairment. OASIS Bangla could be recommended for use in clinical settings and research on patients with anxiety disorders and other disorders with predominant anxiety symptoms. Due to its brevity and strong psychometric properties, it would be especially useful for short and accurate screening of anxiety and would help in mapping therapeutic change in clinical practice.

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