ORIGINAL ARTICLE

Validation of the Arabic Version of Cognitive Complaints in Bipolar Disorder Rating Assessment (COBRA)

Validation de la version arabe de l'évaluation des plaintes cognitives dans les troubles bipolaires (COBRA)

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Abstract

Introduction: Cognitive disorders can be early and persistent symptoms of bipolar disorder, even in the euthymic phase. These impairments significantly affect patients' quality of life. Early detection and regular follow-up are therefore crucial to effective, comprehensive management. To achieve this, it is essential to have validated tools adapted to the patient's language, guaranteeing accurate and reliable assessment. To facilitate this task, we chose to translate and validate the Arabic version of the COBRA scale.

Aim: The main objective of this study was to translate and validate the Arabic version of the Cognitive Complaints in Bipolar Disorder Rating Assessment (COBRA) scale. Specifically, we aimed to evaluate the psychometric properties, including reliability, validity, and feasibility of the Arabic version of the COBRA in a sample of Arabic-speaking individuals with bipolar disorder and healthy controls.

Methods : This is a psychometric validation study of the Arabic version of the COBRA, obtained by a back-translation method of the original version, conducted on a sample of 161 participants, including 71 patients diagnosed with bipolar disorder and followed at Razi Hospital and 90 subjects with no personal or family psychiatric history, as assessed by the MINI International Neuropsychiatric Interview. The validity study was based on face and content validity, reliability, discriminative validity, construct validity and feasibility.

Results : The Arabic version of the COBRA demonstrated satisfying psychometric properties with excellent internal consistency (Cronbach's alpha=0.86) and all inter-item correlations significantly positive ($p < 0.05$). Bipolar patients showed significantly greater cognitive complaints than healthy controls, with a mean total score of 17.53 ± 5.21 versus 7.12 ± 1.7 respectively, suggesting high discriminative validity of the instrument. Convergent validity was confirmed by significant correlations ($p<0.001$) with cognitive tests. Factor analysis revealed a four-factor structure explaining 57.48% of the variance, with a dominant factor. The analysis yielded a cutoff score of 10.5 for identifying cognitive impairments with a sensitivity of 90% and a specificity of 97%. Furthermore, COBRA scores were significantly associated with age ($r = 0.242$, $p = 0.002$), duration of illness ($r = 0.420$, $p < 0.05$), and annual hospitalizations ($r = 0.215$, $p = 0.042$).The scale also demonstrated high feasibility.

Conclusion : The Arabic version of the COBRA has very satisfactory psychometric properties and can be used to screen for cognitive complaints in patients with bipolar disorder.

Keywords : Bipolar disorder - Translation - Questionnaire - Arabic - Cognitive complaints

Résumé

Contexte : Les troubles cognitifs peuvent être des symptômes précoces et persistants du trouble bipolaire, même pendant la phase euthymique. Ces modifications entraînent de manière significative la qualité de vie des patients.

Objectifs : L'objectif principal de cette étude était de traduire et de valider la version arabe de l'échelle d'évaluation des plaintes cognitives dans le trouble bipolaire (COBRA).

Méthodes : Il s'agit d'une étude de validation psychométrique de la version arabe du COBRA, obtenue par une méthode de rétro-traduction, réalisée sur un échantillon de 161 participants, dont 71 patients observés avec un trouble bipolaire suivis à l'hôpital Razi, et 90 sujets sans révélé psychiatriques.

Résultats : La version arabe du COBRA a démontré des propriétés psychométriques satisfaisantes avec une excellente cohérence interne (alpha de Cronbach = 0,86) et toutes les corrélations inter-items significativement positives. Les patients bipolaires ont présenté des plaintes cognitives significativement plus importantes que les témoins sains, avec un score total moyen de 17,53 ± 5,21 contre 7,12 ± 1,7 respectivement, suggérant une grande validité discriminante de l'instrument. La validité convergente a été confirmée par des corrélations significatives avec les tests cognitifs. L'analyse factorielle a révélé une structure à quatre facteurs entraînant 57,48 % de la variance, avec un facteur dominant. L'analyse a permis de déterminer un seuil de 10,5 pour identifier les troubles cognitifs, avec une sensibilité de 90 % et une précision de 97 %. L'échelle a montré une grande faisabilité.

Conclusion : La version arabe du COBRA possède des propriétés psychométriques très satisfaisantes.

Mots clés : Trouble bipolaire - Traduction - Questionnaire - Arabe - Troubles cognitifs

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Introduction

Bipolar disorder (BD) is a chronic and recurrent psychiatric illness characterized by alternating episodes of mania, hypomania, and depression. It affects approximately 1 to 2% of the general population [1], and is recognized by the World Health Organization as a leading cause of morbidity and disability worldwide [2,3]. BD is among the top ten causes of disability-adjusted life years (DALYs) in individuals aged 15–44, due to its early onset, chronicity, and significant impact on functioning [4].

Beyond mood symptoms, growing evidence suggests that bipolar disorder is associated with persistent cognitive impairments that can affect multiple domains, including attention, executive function, memory, and processing speed [5]. Notably, up to 30% of patients with BD exhibit cognitive deficits even during euthymic phases, which are periods of remission in mood symptoms [6]. These deficits are not only trait-related but also have a substantial impact on psychosocial functioning, occupational performance, and overall quality of life [7] . Cognitive impairments in BD are observed across all illness phases and subtypes, and some studies have reported a paradoxical increase in perceived cognitive dysfunction during remission [8]. Early identification and management of these cognitive impairments are crucial factors in optimizing disease stability, improving patients' functional capacities, and consequently, their quality of life [9].

Multiple studies have reported persistent cognitive deficits during the inter-episode phases of bipolar disorder. An Australian meta-analysis found that nearly 50% of individuals with bipolar disorder exhibit residual cognitive impairments during euthymic periods [10].

Two other authors reported similar prevalence rates of approximately 40% [11,12]. Similarly, a study published in 2019 provided further evidence of cognitive impairment during the inter-episodic period in euthymic patients [13]. A thesis found that residual cognitive impairment affected nearly half (46.7%) of the 120 bipolar disorder patients in the Tunisian study population during the inter-episodic phase and significantly contributed to their functional impairment [14].

In clinical practice, this calls for accessible, validated tools for assessing subjective cognitive complaints. While several instruments have been developed and validated in Western contexts, there remains a lack of culturally and linguistically adapted tools for Arabic-speaking populations. To our knowledge, Tunisian studies and theses have rarely focused on validating instruments that assess subjective cognitive difficulties in BD, despite the clinical relevance of such evaluations.

The primary objective of this study was to evaluate the psychometric properties of the Arabic version of the COBRA (Cognitive Complaints in Bipolar Disorder Rating Assessment) scale. A secondary objective was to explore the associations between subjective cognitive complaints measured by the COBRA scale, objective neuropsychological test performance, and clinical variables related to the course of the illness in a Tunisian population.

Methods

Participants

This study was conducted from April 1 to July 1, 2024, in the university hospital departments "B" and "E" of Razi Psychiatric Hospital in Manouba, as well as at the primary healthcare center of Manouba. A total of 161 participants were included: 90 patients were recruited from Razi Psychiatric Hospital, and 70 healthy controls were selected from the primary care center during the same period. They were recruited during their regular follow-up appointments, while attending their scheduled medical consultations.

Patients followed for bipolar I or II disorder according to the criteria of the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) and meeting the following criteria: 1) being aged 18 to 65 years; 2) meeting criteria for euthymia for at least three months prior to the assessment (Euthymia for the three months preceding the assessment was evaluated using a multimodal approach. This included reviewing the patients' medical records for clinical stability, conducting direct interviews with the patients to explore the presence or absence of mood symptoms, and, when possible, gathering additional information from family members or caregivers) ; 3) having scores on the Hamilton Depression Rating Scale (HDRS) ≤ 7 and on the Young Mania Rating Scale (YMRS) ≤ 2; 4) who provided informed consent.

Exclusion criteria included: 1) any medical or comorbid psychiatric condition affecting neuropsychological performance, current drug or alcohol dependence or abuse, and illiteracy; and 2) having undergone electroconvulsive therapy within the past year.

Seventy healthy controls were included who had no current or previous personal or family history of psychiatric disorders, as assessed by the Mini-International Neuropsychiatric Interview (MINI). The MINI is a short structured diagnostic interview. We used the Tunisian Arabic version [8] of the modules dedicated to anxiety disorders, mood disorders, and addictions, according to the DSM-V diagnostic criteria.

This study was approved by the Ethics Committee of Razi Psychiatric Hospital of tunisia. After a detailed verbal explanation of the study, all participants provided informed consent.

Sampling

The sample size was determined to ensure the quality of the collected data. In accordance with psychometric recommendations, particularly those proposed by Nunnally, a minimum of ten participants per item was required [105,16]. For the Cognitive Complaints in Bipolar Disorder Rating Assessment (COBRA), which consists of 16 items, a minimum sample of 160 participants was therefore necessary (10 participants multiplied by 16 items).

Assessments

The cognitive assessment was conducted by the author, a

psychiatrist with formal training in cognitive remediation. This ensured consistency in both the administration and scoring across all participants. It is worth noting that each participant underwent a comprehensive neurocognitive evaluation, averaging seventy minutes in duration, all conducted by the same evaluator to ensure the homogeneity of the results.

Clinical and Demographic Data

Demographic, clinical, and pharmacological information for all participants was gathered through structured interviews and medical record reviews. The 17-item Hamilton Depression Rating Scale (HAM-D20) and the Young Mania Rating Scale (YMRS21) were administered to evaluate depressive and manic symptoms, respectively. The Mini-International Neuropsychiatric Interview (MINI) was used to confirm the absence of psychiatric antecedents in the healthy controls.

Subjective cognitive measure

The COBRA is a 16-item self-report questionnaire designed to measure subjective cognitive difficulties, including executive function, processing speed, working memory, attention and mental tracking. Each item is rated on a 4-point Likert scale: 0 = never, 1 = sometimes, 2 = often, and 3 = always. The total score is calculated by summing the scores of all items. Higher scores indicate greater subjective cognitive complaints. The linguistic adaptation of the COBRA began with an Arabic translation obtained through Brislin's back-translation method [10]. The research team and translators carefully analyzed the items until they agreed on an appropriate version that maintained equivalence between the original English and Arabic versions.

Objective cognitive measure

All participants underwent a comprehensive neuropsychological assessment to evaluate various cognitive domains, as follows:

- Processing speed: Phonemic Verbal Fluency (F-A-S) and Trail Making Test–Part A (TMT-A) [11–13,17]
- Verbal learning and memory: Hopkins Verbal Learning Test (HVLT) in tunisian version; [18,19]
- Executive functions: Trail Making Test–Part B (TMT-B) [20–23]
- Working memory and attention : The Digit Span Backwards Task ; [24]
- Semantic memory : Categorical verbal fluency

Validity and reliability assessment

The internal consistency reliability of the COBRA was assessed using Cronbach's alpha coefficient and inter-item correlation analysis [25,26].

To assess the discriminative validity of the test, we compared the performance of individuals with BD to that of healthy controls [27–29].

Concurrent validity for the COBRA was assessed in two ways: by examining the relationship between the COBRA and five objective neuropsychological tests, and by investigating the potential correlations between the COBRA and illness course [30].

The optimal point for the COBRA was determined by means of ROC curve.

An exploratory factor analysis using the principal axis factoring method with Kaiser normalization was conducted to examine the internal structure of the COBRA.

Feasibility was defined as the percentage of patients and controls who completed the questionnaire in its entirety[31].

The assessment battery took approximately 50 to 60 minutes to complete, depending on the participant. A 10-minute break was provided if requested by the participant.

Statistical analysis

Statistical analyses were conducted using SPSS for Windows, version 26.0. Internal consistency was evaluated using Cronbach's alpha. The Shapiro-Wilk test assessed the normality of the data distribution. Inter-item correlations were examined to evaluate the questionnaire's internal consistency. Spearman's correlation coefficients were calculated to investigate potential relationships between the COBRA, neuropsychological tests, and clinical variables.

Group comparisons between patients and controls were performed using parametric t-tests and ANOVA. Quartimax rotation was applied for factor analysis, and the ROC curve was used to determine the optimal cutoff for distinguishing between patients and controls.

Prior to conducting factor analyses, Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy were used to assess data suitability[29,30]. All statistical tests were conducted at a significance level of 0.05.

Bibliographic research

The literature review was conducted on PubMed and Google Scholar using the following keywords: COBRA, validation, scale, cognitive disorders, bipolar disorder, questionnaire, and psychometrics. We used Zotero software to manage and organize the bibliographic references. We selected articles in both English and French. We also used medical theses as references. We selected the most recent publications that directly related to the subject of study and were of clinical relevance to our research.

Ethical Considerations

The first step of our study involved submitting a request for authorization to the local ethics committee of Razi Hospital, which granted its approval. We obtained written authorization from the author of the Professor Rosa scale to adapt and validate her questionnaire.

Free and informed consent was obtained orally from all participants after they had been informed of the objectives and procedures of the study. To preserve data confidentiality and anonymity, personal information was

deleted before processing the database. Once the final translation of the COBRA was completed, we sent the document to the author of the original version. There is no conflict of interest in relation to this work.

Results

The sample consisted of 161 participants: 90 patients with bipolar disorder and 71 healthy volunteers. Of these, 76 (47%) were male, and 85 (53%) were female. The mean age was 39 ± 12 years, with a range of 19 to 65 years.

Demographic and Clinical Characteristics of Patients with Bipolar Disorder

The sample consisted of 90 patients diagnosed with BD. Of these, 83% (75 patients) had bipolar I disorder, and 17% (15 patients) had bipolar II disorder. The average age at onset was 24 ± 5.14 years, with a range of 14 to 40 years. The median age at onset was 23.5 years. The mean duration of illness was 15 ± 11.5 years, with a range of 1 to 43 years.
A family history of psychiatric disorders was present in 69 (76%) of the patients. Bipolar disorder was the most common family disorder in 40 patients (50%), followed by depressive disorder, anxiety disorder, and schizophrenia. Nine (9%) patients had a family history of suicide attempts or completed suicide (Table 1).

Table 1. Demographic and Clinical Characteristics of Patients with Bipolar Disorder (N = 90)

Variable	Value	Percentage
Type of Bipolar Disorder		
– **Bipolar I**	75 patients	83%
– **Bipolar II**	15 patients	17%
Age at Onset		
– **Mean ± SD**	24 ± 5.14 years	
Duration of Illness		
– **Mean ± SD**	15 ± 11.5 years	
– **Range**	1–43 years	
Family History of Psychiatric Disorders	69 patients	76%
Family Hostory of Bipolar Disorder	40 patients	50%
Family History of Suicide (Attempted or Completed)	9 patients	9%
History of Suicide Attempts	27 patients	30%

At the time of the study, 82 patients (91%) were treated with a mood stabilizer. Of these, 74 patients (83%) received a combination of a mood stabilizer and an antipsychotic. Atypical antipsychotics were used in 51 patients (57%), and typical antipsychotics in 23 patients (26%). Long-acting formulations were used in 21 patients (23%). Fourteen (16%) patients were on antidepressant treatment. A history of suicide attempts was reported by 27 (30%) patients.

Internal consistency

The internal consistency of the 16-item scale was found to be high, with a Cronbach's alpha coefficient of 0.86, suggesting that the items are sufficiently homogeneous. Additionally, the inter-item correlations were significant and positive.

Validity as a discriminative measure to detect differences between patients with BD and healthy controls

For the COBRA, statistical analysis revealed a significant difference in the distribution of responses between the two groups for the total mean score (17.5 in patients vs. 7.12 in healthy subjects; $p < 0.001$), thus confirming the test's ability to discriminate between the two cognitive profiles (Table 2).

Table 2. Comparison of Cognitive Performance Between Bipolar Patients and Controls

Cognitive Domain	Cognitive Test	Score	Bipolar Patients (Mean)	Controls (Mean)	p-value (ANOVA)
Cognitive Complaints	COBRA (Total Score)		17.5	7.12	<0.001
Memory	HVLT (Total Immediate Recall)		21.6	26.92	<0.001
	HVLT (Delayed Recall)		09.04	10.84	<0.001
	HVLT (Discrimination Index)		11.24	11.83	<0.001
Verbal Fluency	Fluency Verbal Semantic	Number of Words	14.93	21.29	<0.001
Working Memory	Digit Span (Backward)		2.97	3.5	<0.001
Processing Speed & Motor Execution	Trail making Test A TMT A (Time)		66.22	33.26	<0.001
	TMT A (Errors)		0.65	0.09	<0.001
Executive Functions	Fluency Verbal Phonemic	Number of Words	10.7	16	<0.001
	TMT B (Time)		126.9	96.87	<0.001
	TMT B (Errors)		0.15	1.54	<0.001

Associations between subjective and objective cognitive measures

Due to the absence of a validated Arabic instrument for assessing cognitive complaints in BD, we used six neuropsychological tests that evaluate similar cognitive domains to establish concurrent validity.
In patients group, a significant negative correlation was found between the total COBRA score and the total score of cognitive tests (HVLT, digit span, phonemic and categorical verbal fluency), with a negative Pearson correlation coefficient and $p < 0.001$.
The COBRA score was positively correlated with poorer performance on the TMT (parts A and B), as indicated by longer completion times and more errors (Table 3).

Table 3. Correlations between mean total COBRA score and cognitive test scores.

Cognitive Domain	Cognitive Test	Correlation with Total COBRA Score (r)	p-value
Memory	HVLT - Total Immediate Recall	-0.618**	<0.001
	HVLT - Delayed Recall	-0.443**	<0.001
	HVLT - Discrimination Index	-0.475**	<0.001
Verbal Fluency	Fluency Verbal Semantic -Number of Words	-0.567**	<0.001
Working Memory	Digit Span - Backward	-0.444**	<0.001
Processing Speed & Motor Execution	TMT A - Time	**0.705****	<0.001
	TMT A - Errors	**0.485****	<0.001
Executive Functions	Fluency Verbal Phonemic - Number of Words	-0.464**	<0.001
	TMT B - Time	**0.725****	<0.001
	TMT B - Errors	**0.622****	<0.001

ROC curve

We analyzed the scale's discriminative capacity between patients and controls by means of the diagnostic performance or ROC curve. The area under the curve was 0.971. The discriminative capacity analysis indicates that a score of 10.5 obtains the best balance between sensitivity (90%) and specificity (97%) (See Fig. 1).

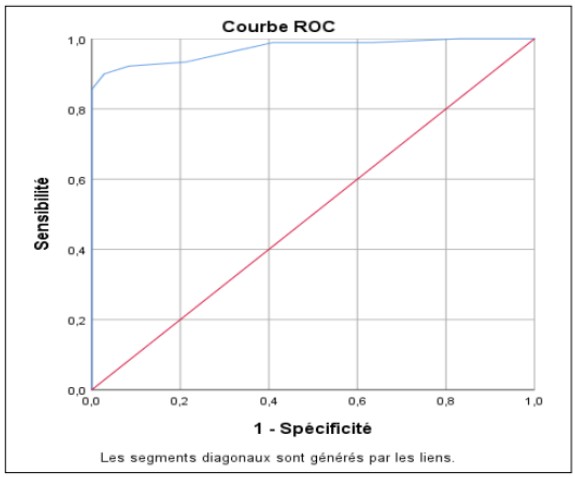

Figure 1. ROC curve between patients and controls. The area under the curve was 0.971. The cut-off point 10.5 indicates the best balance between sensitivity and specificity.

Factorial analysis

The study of the internal structure of the COBRA, after rotation (using the quatrimax method), identified a four-factor structure, which accounted for 57.48% of the total variance. The first factor was the most dominant, explaining 32.991% of the variance, followed by the second (9.03%), third (7.85%), and fourth (7.6%). However, given the close factor loadings for the second, third, and fourth factors, the original one-factor solution was confirmed (Table 4).

Table 4. Factorial loading on the COBRA.

	Factor			
	1	**2**	**3**	**4**
item1	0.469	0.506	0.330	-0.366
item2	0.606	0.097	-0.365	-0.060
item3	0.365	0.583	-0.063	0.482
item4	0.488	0.213	-0.497	0.334
item5	0.582	-0.049	0.001	0.174
item6	0.665	0.162	-0.330	-0.021
item7	0.584	-0.177	-0.145	-0.468
item8	0.643	-0.461	-0.382	-0.052
item9	0.440	0.071	0.097	0.306
item10	0.484	0.279	0.352	-0.019
item11	0.651	0.004	0.024	-0.212
item12	0.589	0.144	0.227	-0.261
item13	0.309	-0.506	0.408	0.422
item14	0.706	-0.262	0.221	0.264
item15	0.691	0.021	0.287	0.068
item16	0.717	-0.305	0.054	-0.154

Feasibility

Finally, the results showed a high feasibility of the COBRA since that the totality of participants answered all items of the instrument.

Discussion

The COBRA showed satisfactory psychometric properties with very high internal consistency and convergent validity as indicated by a significant correlation with six neuropsychological tests. As expected, the COBRA total score was higher in patients compared to healthy controls suggesting the discriminative validity of the instrument.

The cut-off point to discriminate subjective cognitive function between patients and controls was 10.5, the same found in the original validation study in English, the Spanish and Brazilian study. Furthermore, the COBRA demonstrated a unidimensional structure, suggesting that patients perceive their cognitive deficits as a general decline rather than distinguishing impairments in specific cognitive domains. Therefore, 16-item COBRA seems to be a useful instrument to assess cognitive complaints in BD; and it is ready available for its use in both, clinical practice and research settings.

We also found significant correlations between the Cognitive Battery for Rating Attention (COBRA) and six neuropsychological tests in single measures related to executive function, working memory, verbal and visual memory. These neuropsychological tests included Phonemic Verbal Fluency (F-A-S), Trail Making Test–Part A (TMT-A), Hopkins Verbal Learning Test (HVLT) in

Tunisian version, Trail Making Test–Part B (TMT-B), Digit Span Backwards Task, and Categorical Verbal Fluency.

Our results are similar to those of the original version, which demonstrated excellent internal consistency for all its items, with a Cronbach's alpha coefficient of 0.913 [32,33]. Studies by Tirado-Durán (Spain, 2024), Toyoshima K (Japan, 2017), Xiao L (China, 2015), and Lima et al. (Brazil, 2018) also reported high alpha values (above 0.90), indicating excellent internal consistency. The study by Momeni et al. (Iran, 2023) presented a slightly lower alpha coefficient (0.72) but still remained acceptable [34–38].

The inter-item correlations of the COBRA scale, assessed by Pearson's correlation coefficient, are all positive and significant ($p < 0.05$), attesting to its good internal consistency. No inter-item correlation exceeded 0.8, indicating the absence of redundancy and that each item contributes unique information to the scale. These results further strengthen the reliability of the COBRA scale, complementing the Cronbach's alpha coefficient.

Validation studies of the COBRA conducted in English, Brazil, Japan, and Spain did not specify inter-item correlations. However, Chinese and Iranian studies reported satisfactory inter-item correlations, suggesting good item homogeneity.

Discriminant validity assesses a test's ability to differentiate between different groups or conditions and determines whether the test can correctly distinguish theoretically distinct groups [28]. To examine the discriminant validity of the Arabic version of the COBRA, we compared the total scores of this scale and neurocognitive test performance between a group of bipolar patients and a control group. Statistical analyses revealed a significant difference between the two groups regarding the total COBRA score (mean = 17.5 for patients vs. 7.12 for controls; $p < 0.001$), as well as in the other administered tests. This significant difference confirms the ability of the Arabic version of the COBRA to effectively discriminate between the cognitive profiles of patients and healthy subjects, thus demonstrating its discriminant validity. These results are consistent with previous studies conducted on Chinese, Spanish, and Iranian populations.

Given the absence of a specific and validated Arabic assessment tool for cognitive complaints in bipolar patients, we resorted to objective cognitive tests to establish the external validity of our instrument. All observed correlations were statistically significant ($p < 0.01$), confirming the existence of a relationship between COBRA scores and performance on the various cognitive tests, thus reinforcing construct validity. This convergence suggests that the COBRA accurately measures cognitive difficulties, consistent with the underlying theory.

The convergent validity of the English and Japanese versions was assessed using the Frankfurt Complaint Questionnaire (FCQ), which is not available in a validated Arabic version. The convergent validity of the Brazilian version was assessed by comparing the total COBRA score to the cognitive domain of the Functional Assessment Staging Test (FAST). The MMSE was used to assess the external structural validity of the Iranian version, the MoCA for the Chinese version, and the APTM and AMTS questionnaires for the Spanish version.

The ROC curve allowed us to identify a COBRA threshold of 10.5, which offers the best trade-off between sensitivity and specificity, thus optimizing the test's performance with a sensitivity of 90% and a specificity of 97%. The area under the curve (AUC), estimated at 0.971 ($p<0.001$), demonstrated an excellent screening ability of the COBRA. In the validation study of the original version of the scale, the threshold was set at 10, corresponding to a specificity of 68.5% and a sensitivity of 68.1% (Table 5).

Similarly, for the Brazilian study, a threshold of 10 was retained, with a sensitivity of 64.7% and a specificity of 72.3% [58]. For the Chinese validation study, the threshold for the total COBRA score to detect cognitive impairment was set at 11 points, with a specificity of 81.5% and a sensitivity of 68.8%. This threshold value was not calculated for the Spanish and Japanese validations.

Although most validations have established a threshold of 10, the Iranian study revealed an optimal threshold of 28 with a sensitivity of 72% and a specificity of 69%, suggesting that sociocultural factors could modulate the expression of the phenomenon studied, hence the need to adapt cognitive impairment assessment tools according to cultural contexts.

Several factors can influence this threshold value. Indeed, in a clinical study where the number of patients is greater than the number of control subjects, the threshold is generally higher. This is explained by the fact that subjects followed for BD have more cognitive complaints than the general population [39–42].

Table 5. Cut-off Scores for the Total COBRA Score by Study Population

Study	Language	Year	% Clinical Population	Threshold	Specificity	Sensitivity
Our study	Classical Arabic	2024	44.1%	10.5	97%	90%
Momeni et al.	Persian	2023	50%	28	69%	72%
Lima el al.	Portuguese	2018	57%	10	72.3%	64.7%
Xiao	Chinese	2015	49%	11	81.5%	68.8%
Rosa AR	English	2013	42.3%	10	68.5%	68.1%

Exploratory factor analysis identified four factors, explaining 57.48% of the variance. Given the dominant first factor (32.991% of variance), a one-factor model was retained, consistent with previous COBRA studies.

Factor rotation did not alter the model's explained variance, supporting the identified factor structure. The original COBRA had a two-factor structure, with the first factor accounting for 43.77% of the variance. While the Brazilian and Iranian versions indicated three factors, the dominant first factor in the Brazilian version (38.42%) suggested a unidimensional structure. The Japanese and Chinese versions also showed a unidimensional structure with positive loadings. Despite initial identification of multiple factors, most COBRA validation studies converge on a unidimensional structure, with a dominant factor explaining a substantial portion of the variance, indicating strong internal consistency. This aligns with the notion that cognitive complaints often relate to closely linked cognitive domains, including working memory, attention, and processing speed.

The questionnaire demonstrated high feasibility based on several indicators. Participants consistently understood the questions, and their responses were directly relevant to the study aims. The 100% response rate and the perceived appropriateness of the 10-minute duration make it a practical tool for clinicians.

Our analysis showed a positive association between cognitive complaints, assessed using the COBRA, and various clinical features of BD. Specifically, age, illness duration, and hospitalization frequency were linked to increased cognitive complaints [43,44]. These findings suggest that aging, chronic illness, and severe manic or depressive episodes requiring hospitalization may cumulatively affect cognitive function in individuals with BD [45].

Recommendations

This study demonstrates that Arabic version of the COBRA is a valid and reliable tool for the screening and monitoring of cognitive impairments in individuals with bipolar disorder.

- Systematic and early screening of cognitive deficits in bipolar patients using a validated tool such as the COBRA is essential to improve diagnosis, tailor therapeutic approaches, and enhance long-term outcomes.
- Cognitive remediation should be systematically included in treatment plans for bipolar patients in remission to strengthen cognitive abilities and prevent relapse through its neuroprotective effects.
- Longitudinal research could assess the sensitivity of the COBRA in detecting cognitive changes over time and in response to interventions.
- Future validation studies involving larger and more diverse samples are necessary to further elucidate the dimensional structure of the COBRA and to strengthen its psychometric and construct validity.
- The continued development of culturally adapted cognitive tools like the COBRA will facilitate more personalized and integrative management of bipolar disorder in Arabic-speaking populations and support transdiagnostic research on cognitive functioning across psychiatric disorders.

Conclusion

The Arabic version of the COBRA-A is a brief 16-item, self-reported, one-dimension instrument, detecting the main cognitive deficits experienced by bipolar patients such as executive function, processing speed, working memory, verbal learning and memory, attention/concentration, and mental tracking. The cut-off point of the instrument that discriminates subjective cognitive function between patients and controls is 10,5. The study demonstrates that the COBRA-A is a valid and reliable measure for assessing subjective cognitive complaints in bipolar disorder populations in Arab-speaking regions.

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