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Psychometric Properties of Cognitive Complaints in Bipolar Disorder Rating Assessment in Iranian Bipolar Patients

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Abstract

Background: Cognitive impairments are common in bipolar disorder, which can negatively impact patients' psychological and psychosocial functioning, but there are no tools for assessing cognitive deficits, especially in patients with bipolar disorder in Iran.
Objectives: This study assessed the psychometric properties of the Cognitive Complaints in Bipolar Disorder Rating Assessment (COBRA) scale in Iranian patients with bipolar disorder (BD).
Methods: Eighty patients diagnosed with bipolar spectrum disorder were selected from Tehran's major psychiatric facilities: Razi Psychiatric Hospital and Taleghani Hospital. A purposive sampling method was followed to select 80 non-patient control individuals from the general population in Tehran. Participants were evaluated using the Beck Depression Inventory-II (BDI-II), the Bech-Rafaelsen Mania Rating Scale (BRMAS), the Mini-Mental State Examination (MMSE), and the COBRA. The data were analyzed using SPSS-24 to evaluate convergent and discriminant validity, test-retest reliability, and internal consistency.
Results: The convergent validity was examined by calculating the correlation between the scores on the COBRA and those on the MMSE; the results were significant ($r = -0.63$, $P < 0.001$). Discriminant validity was assessed by comparing the COBRA total scores between the patients with BD and the control group; the results indicated a significant difference between the two groups ($t = 6.413$, $P = 0.001$). The CFA and EFA showed that the one-factor structure of COBRA was the best model. The Cronbach's alpha of 0.72 indicated an internal consistency. A test-retest reliability estimate of 0.84 indicated the high reliability of the scale. The current investigation suggested a cutoff score of 28, with 0.72 sensitivity and 0.69 specificity.
Conclusions: Our translated version of the COBRA in Persian in this study showed adequate psychometric properties. This test can be considered an applicable instrument in investigating cognitive complaints in patients with bipolar disorder in Iran.

Keywords: Bipolar Disorder, Cognition, Iran, Psychometrics

1. Background

Bipolar disorder (BD) is a severe and recurrent mental disorder affecting almost 1% - 3% of community members (1). The Diagnostic and Statistical Manual of Mental Disorders 5 (DSM-5) defines bipolar disorder as a disorder in which mania is associated with depressive symptoms. Mania is characterized by a persistent, abnormally elevated, or irritable mood lasting at least one week, accompanied by increased purposeful activity and energy level, increased self-confidence (grandiosity), flight of ideas, distractibility, talkativeness, and increased risky behaviors (2).

Bipolar disorder is a chronic disorder with a significant recurrence rate. This chronic mental illness causes periods of depression and elevated mood (3). The risk of suicide is increased significantly among patients with BD. Suicidal ideation is 15 to 20 times higher in patients with BD than in the general population. Fifteen percent of patients with BD have reported at least one suicide attempt in their lifetime (4).

Cognitive impairment is considered one of the main features of psychotic disorders. It may also present with bipolar disorder, especially in chronic courses (5). Evidence has shown that patients with BD also experience cognitive impairment in both the acute and recovery phases of their illness (5, 6).

Cognitive impairment is seen in patients with bipolar disorder. In fact, various domains such as attention, verbal

memory, and executive function are impressed in bipolar patients (7, 8), which can negatively impact patients' psychological and psychosocial functioning (9-12). It is important to correctly diagnose and address any cognitive impairment in patients with BD. This can help predict functional disorders (13, 14) or patients' adherence to treatment (15). It may also improve the patient's overall function in different domains, such as personal care and social life, and subsequently increase their quality of life (16).

Over the past two decades, cognitive performance has become important in functional evaluation in clinical and research areas. Emerging evidence supports the major role of cognitive function assessment in BD (17, 18). However, no consensus exists on measuring cognitive function in patients with severe mental illness. Objective measurement tools in neuropsychological testing allow us to assess the cognitive function of people with BD and compare them with the general population. In contrast, cognitive assessment tools only allow the comparison of the cognitive function in patients before and after the onset of psychiatric illness (19). Patients' understanding of their cognitive function is an important issue that needs to be addressed. Hence, accurate and complete cognition assessment requires appropriate cognitive measurement instruments in this field (17).

There are multiple clinical instruments to assess cognitive impairment in patients with mental disorders (20, 21). The Cognitive Complaints in Bipolar Disorder Rating Assessment (COBRA) was developed by the bipolar disorder program at the Hospital Clinic of Barcelona to indicate the main daily cognitive problems experienced in bipolar patients (22). The primary version was assessed in a pilot study with bipolar patients and normal controls. The final version of the COBRA is a 16-item self-reported tool to measure subjective cognitive dysfunctions, including executive function, working memory, verbal learning and memory, attention/concentration, processing speed, and mental tracking. The total score is calculated when the scores of all items have been estimated. The higher the score, the more subjective complaints (22). The COBRA has been translated into several languages, such as Spanish, French, Chinese, Danish, and Portuguese, and utilized in clinical and research fields (21, 23).

Iran has no clinical instrument for screening or assessing cognitive impairment in patients with bipolar disorder. As COBRA is a subjective and fast implementation tool, it can be easily used in psychiatric hospitals. We believe it is important to validate an appropriate tool for this purpose.

2. Objectives

The primary goal of this study was to translate the COBRA into Persian and evaluate its psychometric properties in Iranian patients with bipolar disorder.

3. Methods

3.1. Procedure

In this descriptive correlational study, after obtaining permission from the developer of the COBRA and based on the method introduced by Wild et al. (24), the questionnaire was translated into Persian by the author and other academicians fluent in English. An English expert back-translated the Persian version of the COBRA into English. Then, the Persian and backward translations were studied and compared with the study team in a meeting. After that, the required modifications were applied in the Persian version (mostly disagreements about choosing the right words, for instance, using effort or strive instead of struggle).

3.2. Participants

The research sample consisted of 80 patients with BD (with no psychotic features) and 80 controls from Tehran's general population (a community of university students). The sample was selected using a purposeful method. The patient group was selected from patients diagnosed with bipolar disorders I and II admitted to Razi or Taleghani Psychiatric Hospitals in Tehran from the beginning of 2018 to the end of 2019. The average length of stay for a patient in this study was around 17 days (Table 1). All selected patients were treated with mood stabilizer medications, and their psychiatric symptoms had become stable during their admission before participating in this study. Patients scoring below 6 on the Beck Depression Inventory Questionnaire (BDI-II) and less than 13 on the Bech-Rafaelsen Mania Rating Scale (BRMAS) were recruited for this study.

The exclusion criteria for patients were substance use, psychotic features, history of traumatic brain injury or electroconvulsive treatment, and any active or major medical history. The exclusion criteria for the control group were a family history of any psychiatric disorder in the first-degree relatives and any personal medical history.

3.3. Ethical Considerations

We obtained approval for this study from the Ethics Committee of the University of Social Welfare and Rehabilitation Sciences of Tehran (Code No: IR.USWR.REC.1398.157).

The study's objectives were described to the patients and their families, when applicable, and to the control group participants. They received and signed an informed consent and were asked to answer the questionnaires.

Table 1. Demographic Characteristics of the Participants

	Patients [a]	Controls [a]
Gender		
Male	44 (55.0)	45 (56.3)
Female	36 (45.0)	35 (43.8)
Education		
Primary	12 (15.0)	9 (11.3)
Middle school	36 (45.0)	34 (42.5)
Diploma	20 (25.0)	26 (32.5)
Bachelor	12 (15.0)	11 (13.8)
Marital status		
Unmarried	43 (53.8)	34 (42.5)
Married	21 (26.3)	31 (38.8)
Divorced or widow	16 (20.0)	15 (18.8)
Occupation status		
Employed	49 (61.3)	84 (80)
Unemployed	31 (38.8)	16 (20)
Type of disease		
Bipolar I disorder	46 (57.5)	
Bipolar II disorder	34 (42.5)	
Age	38.40 ± 10.51	32.93 ± 9.92
Age of onset disease	30.50 ± 8.32	
Length of hospitalization	16.91 ± 17.73	
Duration of current hospitalization	15.3 ± 8.6	
Number of hospitalization	2.52 ± 1.5	

[a] Values are presented as mean ± SD or No. (%)

3.4. Instruments

3.4.1. Beck Depression Inventory

Beck Depression Inventory (BDI-II) is a self-reporting tool to assess the severity of depressive symptoms. It includes 21 items designed to assess depressive symptoms in patients with suspected depressive disorders (25). The revised version of the BDI-II is more compatible with DSM-V than its original version and covers all components of depression per the cognitive theory. Beck et al. (26) showed that the second version of this questionnaire, like the previous version, illustrates the existence and severity of depressive symptoms in patients and normal individuals. Their study measured alpha values of 0.68 and 0.81 for patient and non-patient groups, respectively (26). In a previous study in an Iranian sample, the BDI-II was reported to have excellent reliability (Cronbach's alpha = 0.92) (27).

3.4.2. Bech-Rafaelsen Mania Rating Scale

This 11-item rating scale was developed in 1979 by Bech, Bowling, Kramp, and Rafalsen to assess the symptoms of mania. Each item is scored 0 - 4, where 0 indicates normal range, and 4 indicates severe symptoms. The total score can reflect the severity of mania ranging from 15 to 44. Studies have shown that these 11 items are enough to assess the severity of mania symptoms. The BRMAS has shown acceptable external validity (0.73) and high internal consistency (0.7) (28).

3.4.3. Short Mini-Mental State Examination Test

The MMSE is a screening test that can be used to assess one's cognitive status. This instrument can follow changes over time. The total score is 30, and scores below 25 and 20 indicate possible and definite cognitive disorders in the examined person (29). One of its limitations is sensitivity to training. People with higher education and mild cognitive impairments may perform well enough to mask their symptoms, while someone with a low level of education and no cognitive disorder may score in the "disorder" range (29). The Persian version of the MMSE in a community sample of Iranian people was valid and reliable (Cronbach's alpha = 0.78) (30).

3.5. Statistical Analysis

Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) for Windows, version 24.0. Internal consistency was assessed using Cronbach's alpha. Spearman's correlation coefficients were calculated to examine test-retest reliability and the possible relationship between the COBRA and MMSE. Groups (patients and controls) were compared using a parametric *t*-test.

4. Results

Table 1 shows the participants' demographic characteristics. One hundred sixty individuals participated in this study, consisting of 80 patients with BD and 80 controls. The mean (± SD) age of the patient and control groups was 38.4 (10.51) and 32.9 (9.92) years, respectively. Also, 55% of the patient population and 56.3% of the control group were male.

4.1. Internal Consistency

The Cronbach's alpha coefficient was used to examine the internal consistency of the COBRA. A Cronbach's alpha of 0.72 was detected for the total scale, suggesting that the items were sufficiently homogeneous. Table 2 shows the internal consistency of the questionnaire.

Table 2. Item Inter-correlations and Internal Consistency

	Item-total Correlation	Alpha, if the Item Deleted
1	0.36	0.70
2	0.54	0.88
3	0.21	0.71
4	0.31	0.70
5	0.39	0.70
6	0.33	0.70
7	0.13	0.72
8	0.33	0.70
9	0.30	0.71
10	0.14	0.72
11	0.10	0.74
12	0.52	0.68
13	0.35	0.70
14	0.46	0.69
15	0.38	0.70
16	0.30	0.71

4.2. Convergent Validity

We used the MMSE to assess the convergent validity. Spearman's correlation coefficient was calculated between the scores on MMSE and COBRA. A significant correlation ($r = -0.63$, $P < 0.001$) was found between the total MMSE and COBRA scores.

4.3. Discriminant Validity

To examine the discriminant validity of this Farsi version of COBRA, we compared the total score on this scale between the patient and control groups. The independent *t*-test results showed a significant difference between the two groups ($t = 6.413$, $P < 0.001$), indicating good discriminant validity.

4.4. Test-Retest Reliability

We were only able to examine the test-retest reliability of the Persian version of the COBRA in 35 patients in remission of BD after 10 days of primary test because after discharge from the hospital, we were not able to reach all the patients, and most of the patients did not feel interested in participating in our re-test. The remaining patients were lost to follow-up and did not complete the second testing. We calculated Pearson's correlation coefficient between the first and the second sets of scale scores. The correlation was 0.84, which indicates high test-retest reliability ($P < 0.001$).

4.5. Factor Analysis

The KMO test indicated very good sampling adequacy (0.819). Bartlett's test was significant (chi-square value = 1252.5, P-value < 0.05), showing that the items are correlated and that the factor analysis can fit. After rotation (using the Quatrimax method), the internal structure of the COBRA showed a three factor-structure, as shown in Table 3. However, only one item was loaded in the second factor and two in the third. Values loaded in the second and third factors were very close to the first load, proving the original one-factor structure with 23.49% of the total variance.

Table 3. Factor Loading on the Bipolar Disorder Rating Assessment Scale

	Factor		
	1	**2**	**3**
Item 2	0.693		
Item 12	0.668		
Item 14	0.615		
Item 10	0.219		0.605
Item 3	0.281	0.592	
Item 11	0.552		
Item 1	0.529		
Item 5	0.512		
Item 13	0.495		
Item 7	0.218		0.493
Item 6	0.483		
Item 4	0.462		
Item 15	0.458		
Item 9	0.430		
Item 8	0.427		
Item 16	0.406		

4.6. Feasibility

The results showed the high feasibility of the Persian version of the COBRA. All participants answered all items on the questionnaire.

4.7. Cutoff Point

We performed a ROC curve to examine the COBRA's diagnostic utility. Based on the ROC curve, the optimal cutoff score of 28 yielded a sensitivity of 0.72 and a specificity of 0.69.

5. Discussion

Cognitive impairment can seriously impact an individual's function (31). Psychiatrists and psychologists must consider cognitive assessment as part of their clinical evaluation regarding patients with BD. Therefore, there is a need for a scale that can assess patients' cognition that is reliable and easy to use. The non-specific measurement scales such as MMSE and Frankfurt Component Questionnaire can assess the underlying changes or psychotic symptoms. In contrast, COBRA is the only scale evaluating the cognitive function, including executive function, processing speed, active memory, verbal/memory learning, attention/focus, and mental tracking in patients with BD (18). The COBRA questionnaire can be used as a useful self-reporting scale for screening purposes. In Iran, there are no validated tools for assessing cognitive complaints in patients with BD, so the present study aimed to investigate the psychometric characteristics of the Persian version of the COBRA in patients with BD.

As mentioned above, due to the lack of a reliable and valid Persian instrument for evaluating cognitive complaints in patients with BD, we decided to use the MMSE as a golden test to assess the convergent validity of the COBRA questionnaire. Our findings support the existence of an acceptable convergent validity between the COBRA and the MMSE.

The discriminant validity of the questionnaire was evaluated using a comparison of general scores between patients with BD and the control group. In our study, a higher score and cognitive impairment reports were expected in patients with BD. The Persian version of the COBRA scale can differentiate between patients with BD and healthy individuals ($t = 6.413$). This finding is consistent with the results published by Lima et al. (21) and Yoldi-Negrete et al. (32).

We used Cronbach's alpha coefficient to check the internal consistency of the questionnaire. Calibrated alpha alphabets calculated for all items within an acceptable range indicate a relatively acceptable scale validity. These findings align with the study of Rosa et al. (18) and the Japanese version of COBRA (33).

According to the research results, a study on the psychometric properties of the COBRA instrument presented a one-factor structure with very high internal consistency, indicating that patients are inclined to perceive their deficits as a general cognitive dysfunction rather than to discriminate them in specific cognitive domains. This finding is consistent with previous validation studies with bipolar disorder in other countries (18, 19, 33)

The test re-test reliability of the Persian version of the COBRA was performed using a re-examination of this scale in a group of participants two weeks after the initial assessment. Similar to prior studies (32, 33), the results ($r = 0.84$; $P < 0.001$) indicated a high validity of the test.

5.1. Limitations

This study has several limitations, like similar studies in this field. We identified five major limitations listed below.

First, the tools used in this study are self-reported scales. This increases the likelihood of biases in answers among participants with BD. Second, the sample size is small and only from Tehran. Tehran is Iran's capital city and has a diverse population representing various parts of Iran. However, the population in this study may not be a full representative of all subcultures of Iran. Persian is the country's official language, but culture and local languages or dialects vary across the nation. Third, the present study lacks a gold standard instrument for evaluating cognitive performance. The MMSE was used in lieu of it to evaluate convergent validity. Fourth, we did not collect any collateral information to complement the data obtained from the patients. Finally, we did not use objective testing (neuropsychological tests) to evaluate cognitive function and compare its results with the COBRA scale.

To address these gaps, we recommend that future studies collect data from participants' relatives in addition to self-reporting scales. We also suggest increasing the sample size, examining the scale in other provinces and cities for a more comprehensive analysis, and utilizing objective testing for cognitive evaluation.

5.2. Conclusions

Considering its high validity and compatibility with Iranian society and culture, the Persian version of the COBRA can be considered a valid instrument for assessing the level of cognitive complaints in bipolar patients in Iran. Since assessment is considered one of the important components of clinical interventions, this scale can be a useful tool both in research and clinical settings.

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Footnotes

Authors' Contribution: Fereshte Momeni conceived and designed the study based on the literature. Amin Vatanparast, Maryam Shahmohammadi, and Faeghe Alipour collected the clinical data and managed the data sampling.

Fereshte Momeni and Rosa Alikhani supervised data sampling and participated in referring the participants, and obtained approval from the ethics committee. Amin Vatanparast and Shervin Shadianloo performed the statistical analysis and interpreted the clinical data. Shervin Shadianloo drafted the manuscript. All the authors read and approved the final manuscript.

Conflict of Interests: The authors did not report any conflict of interest in conducting this study.

Ethical Approval: We obtained approval for this study from the Ethics Committee of the University of Social Welfare and Rehabilitation Sciences in Tehran (Code No: IR.USWR.REC.1398.157).

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Informed Consent: The study's objectives were described to the patients and their families when applicable and to the control group participants. They received and signed an informed consent and were asked to answer the questionnaires.

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