

ORIGINAL ARTICLE

RELIABILITY AND VALIDITY OF BECK DEPRESSION INVENTORY AMONG GENERAL POPULATION IN KHYBER PAKHTUNKHWA, PAKISTAN

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Background: Beck Depression Inventory is frequently used for assessing depression across different cultures. Despite widely application of Beck Depression Inventory, there is surprisingly lack of empirical research on psychometric validation of this scale in Pakistan. In this regard the current study has determined the reliability and validity of Beck Depression Inventory in Pakistan.

Methods: Urdu version Beck Depression Inventory was administration to 250 Inpatient and Outpatient Department visitors in Ayub Teaching Hospital, Abbottabad, Khyber Pakhtunkhwa, Pakistan. Initially reliability was determined and later on validity analysis was done. **Results:** The reliability results show that Cronbach alphas ranged from 0.75 to 0.92, whereas inter-item correlations ranged from 0.53 to 0.78. The validity analysis show that factor loadings for all items of Beck Depression Inventory ranged from 0.77 to 0.93. Furthermore, the two subscales presented good model fit indices, thus conforming its construct validity. **Conclusion:** The results of current study show that Beck Depression Inventory has good psychometric properties followed by its administration to general population in Khyber Pakhtunkhwa, Pakistan; therefore this scale could be effectively used for assessing depression in Pakistan

Keywords: Beck Depression Inventory, Reliability, Validity, Depression

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INTRODUCTION

Depression is one of most commonly prevailing mental health problem in Pakistan.^{1,2} The detection and diagnosis of depression among patients in Outpatient Department or Outpatient Department visitors is a critical because majority of patients with major depressive problem are either misdiagnosed or left undiagnosed, resultantly not only the prevalence and rate of depression increases in general population.^{3,4} Such situation if left unchecked could be a serious public health issue. For this reason researchers in past have developed wide variety of tools for screening depression among patients. Moreover, to enhance the detection rate of such tools, the researchers have fine tune these tools.⁵ Among these tools, Beck Depression Inventory is frequently used for assessing depression across different cultures. Despite widely application of Beck Depression Inventory, there is surprisingly lack of empirical research on psychometric validation of this scale in Pakistan.

The Beck Depression Inventory was initially developed as 21-items scale by Beck, ward, mendelson, mock, & erbaugh⁶ revised by Beck⁷. This inventory has three versions, i.e., Beck Depression Inventory, Beck Depression Inventory-IA and Beck Depression Inventory-II.⁸ The 21-items of Beck Depression Inventory measures the dimensions like Sadness, Pessimism, Sense of Failure, Suicidal Wishes, Punishment feelings, Crying and Sleep Disturbance e.t.c.⁶ All of the

versions of Beck Depression Inventory have demonstrated good reliability and validity measures.⁸ The details such findings show that its internal consistency ranged from Cronbach Alpha 0.893-0.94.^{9,10} On the other side the factor loadings for items of Beck Depression Inventory range from 0.50 to 0.83.¹¹ The previous researchers have recommended two factors structure, i.e., affective and somatic components.^{12,13}

Despite wide recognition of Beck Depression Inventory, there is surprisingly lack of empirical research on the psychometric assessment of this scale particularly among the general population of Khyber Pakhtunkhwa, Pakistan. Thus creating serious research gap. In order to fill this research gap, the current study has performed detailed analyses related to psychometric assessment of Beck Depression Inventory. The data was collected from both Inpatient and Outpatient patients, who have visited Ayub Teaching Hospital, Abbottabad, Pakistan during last five months, dating from January, 2015 till May, 2015. The results show that Urdu version of Beck Depression Inventory has demonstrated good psychometric properties. The reliability results show that Cronbach alphas ranged from 0.75 to 0.92, whereas inter-item correlations ranged from 0.53 to 0.78. The validity analysis show that factor loadings for all items of Beck Depression Inventory ranged from 0.77 to 0.93. Furthermore, the two sub scales yielded good model fit indices, thus conforming its construct validity.

The results of current study show that Beck Depression Inventory has good psychometric properties followed by its administration to general population in Khyber Pakhtunkhwa, Pakistan; therefore this scale could be effectively used for assessing depression in Pakistan.

MATERIAL AND METHODS

The sample of current study consisted of 250 Inpatient and Outpatient patients, who had visited department of Psychiatry, Ayub Medical College, Abbottabad, Pakistan during last five months, dating from January, 2015 till May, 2015.

The Urdu version of Beck Depression Inventory was used. It consisted of 21-items covering both affective and somatic components. The affective and somatic components have ten sub scales.

The following Psychometric Analyses were performed for determining validity and reliability:

1. Calculating Cronbach's Alpha Coefficients
2. Calculating inter-item correlations
3. Running Principal Component Analysis
4. Performing Confirmatory Factor Analysis

Following the data collection, reliability and validity analyses were performed by using Bivariate and Multivariate statistical techniques.

RESULTS

The reliability of Beck Depression Inventory was determined by calculating Cronbach's Alpha Coefficients and inter-item correlations. Table-1 shows that the Cronbach's Alpha Coefficients range from Cronbach alphas ranged from 0.75 to 0.92, whereas inter-item correlations ranged from 0.53 to 0.78. Thus proving that Beck Depression Inventory is possessing sufficient internal consistency and reliability.

The validity analysis consisted of determining the Convergent and Discriminant validities. The convergent validity will be determined by Principal Component Analysis. The overall construct validity will be determined by running Confirmatory Factor Analysis.

Principal Component Analysis with Varimax Rotation, extraction of Eigen values >01 was performed. Moreover, Kaiser Meyer Olkin (KMO) was also computed, which is recommended up to 0.60, representing data fitting for the Principal Component Analysis.¹⁴

Table-2 show the result of Principal Component Analysis. The factor loadings range from 0.77 to 0.93. The KMO value was 0.78, furthermore, the Bartlett's Test of Sphericity was significant at $p < 0.005$ level. The factor loadings for symptoms like Sadness, Past Failure, Punishment

feelings and Self-dislike etc ranged from 0.79 to 0.90. Whereas factor loadings for symptoms like Self criticalness, Crying, Indecisiveness and Worthlessness etc ranged from 0.78 to 0.92. Finally, the factor loadings for symptoms like Loss of energy, Changes in sleeping pattern, Changes in appetite and Loss of sex in interest etc ranged from 0.77 to 0.91. It shows that all dimensions of Beck Depression Inventory have good factor loadings, thus conforming its convergent validity.

In addition Principal Component Analysis, the Confirmatory Factory Analysis was also run with Maximum Likelihood Estimation to determine the overall construct validity of Beck Depression Inventory. In this regard following fit indexes were calculated:

1. Normed Chi-square (X /df)
2. Root Mean Square Error Of Approximation (RMSEA)
3. Root Mean Square Residual (RMR)
4. Comparative Fit Index (CFI)
5. Goodness-Of-Fit Index (GFI)

Table-3 shows that all of the fit indices are within the acceptable range. The Normed Chi-square (X /df) value is (8.70/4.2) 2.07. Similarly the RMSEA value is 0.089 and RMR value is 0.078, which is also acceptable. Finally, the values of GFI is 0.98 and CFI is 0.98. Thus conforming that the two factor model for Beck Depression Inventory gives acceptable fit indices. It shows that this inventory has demonstrated good construct validity after its administration among patients in Ayub Teaching Hospital, Abbottabad, Pakistan.

Table-1: Reliability analysis of Beck depression inventory

Components	Inter-Item Correlations	Cronbach's Alpha Coefficients
Sadness	0.53	0.92
Pessimism	0.58	0.85
Past Failure	0.66	0.76
Loss of pleasure	0.68	0.90
Guilty feelings	0.55	0.75
Punishment feelings	0.72	0.76
Self-dislike	0.63	0.89
Self-criticalness	0.62	0.90
Suicidal thoughts and wishes	0.69	0.86
Crying	0.68	0.92
Agitation	0.70	0.75
Loss of interest	0.72	0.77
Indecisiveness	0.54	0.91
Worthlessness	0.76	0.90
Loss of energy	0.64	0.88
Changes in sleeping pattern	0.77	0.92
Irritability	0.65	0.75
Changes in appetite	0.71	0.80
Concentration difficulty	0.57	0.90
Tiredness or fatigue	0.63	0.85
Loss of sex in interest	0.73	0.86

Table-2: Principal component analysis of Beck depression inventory

Components	Factor-1	Factor-2	Factor-3
Sadness	0.79		
Pessimism	0.78		
Past Failure	0.86		
Loss of pleasure	0.88		
Guilty feelings	0.90		
Punishment feelings	0.82		
Self-dislike	0.89		
Self-criticalness		0.90	
Suicidal thoughts and wishes		0.88	
Crying		0.78	
Agitation		0.79	
Loss of interest		0.92	
Indecisiveness		0.91	
Worthlessness		0.90	
Loss of energy			0.80
Changes in sleeping pattern			0.77
Irritability			0.85
Changes in appetite			0.91
Concentration difficulty			0.87
Tiredness or fatigue			0.83
Loss of sex in interest			0.91

Table-3 Fit indexes

Models	X/df	RMSEA	CFI	GFI	RMR
Two factors	2.07	0.089	0.98	0.99	0.078

DISCUSSION

The current study has examined the psychometric properties of Urdu version of Beck Depression Inventory among Inpatient and Outpatient Department visitors in Ayub Teaching Hospital, Abbottabad, Khyber Pakhtunkhwa, Pakistan. The Findings of current study show that Urdu version of Beck Depression Inventory has good psychometric properties.

The findings of current study are in concurrent with findings of previous studies. In this regard Ghassemzadeh, Mojtabei, Karamghadiri, & Ebrahimkhani¹⁵ found that items of Beck Depression Inventory had Cronbach's Alpha Coefficients up to 0.67 and mean inter-item correlation up to 0.52. Furthermore, the items of Beck Depression Inventory yielded good model fit, thus demonstrating construct validity. Similarly Grothe, *et al.*,¹⁶ found that this inventory has internal consistency Cronbach's Alpha Coefficients up to 0.90, with inter-item correlation up to 0.45.

They further found that two factor model had good fit for Beck Depression Inventory. The findings from current study and past studies have proved that Beck Depression Inventory is a reliable and valid tool for the assessment of depression and co-morbid disorders in general population across different cultures.

CONCLUSION

The results of current study show that Beck Depression Inventory has good psychometric properties followed by its administration to general population in Khyber Pakhtunkhwa, Pakistan; therefore this scale could be effectively used for assessing depression in Pakistan

AUTHORS CONTRIBUTION

AAK: Conceived the study design, supervised the study, write up and proof reading, SKM, MMN, SF: Data collection, statistical analysis, literature review

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