RESEARCH ARTICLE

Factor analysis, reliability and validity of a Pashto version of Hamilton rating scale for depression

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Abstract

Objective: To translate and validate the Hamilton Rating Scale (HAM-D) for Depression in Pashto language.

Method: The cross-sectional study was conducted at a tertiary care teaching hospital in Peshawar, Pakistan, from June to November 2021, and comprised patients of either gender diagnosed with depressive illness. The Hamilton Rating Scale for Depression was translated from English to Pashto by 3 bilingual experts using forward-backward method. The version was tested on the participants using exploratory and confirmatory factor analysis, Cronbach alpha reliability and construct validity of the scale. Data was analysed using SPSS 25 and AMOS 26.

Results: Of the 507 patients with mean age 34.56±12.58 years, 317(62.5%) were females, 379(74.8%) were married and 308(60.7%) were uneducated. Factor analysis of HAM-D (Pashto) showed to be a four factor model and Bartlett's test showed significant results indicating that the items were inter-correlated. Regarding construct validity, the factor loading through Item Total Correlation scores revealed highly satisfactory correlation coefficients. Cronbach's alpha reliability of the Pashto version was 0.843, and confirmatory factor analysis indicated a good fit model (0.904) with root mean square error of approximation value 0.075. The scale showed 312(61.5%) participants were severely depressed. Married, uneducated patients and those with higher birth order were significantly severely depressed (p=0.000).

Conclusion: The Pashto version of Hamilton Rating Scale for Depression was found to be a reliable instrument to measure depression and can be used in clinical settings.

Key Words: Depression, Factor analysis, Psychometrics.

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Introduction

Depression is the most common problem in the general population seen at primary care facilities.[1] Also, it is one of the leading causes of premature death and disability with a lifetime prevalence of up to 20%. Depression can also lead to worse health outcomes of other chronic illnesses, like angina, arthritis, asthma and diabetes.[1] It is frequently related with psychosocial disability, absenteeism, functional impairment and reduced productivity at work.[2] It was found that major depressive disorder can cause substantial functional distress.[3] Depression can adversely affect the quality of life, general physical and mental health and ability to work, and is also related to chronic illnesses.[4] In this context, it is essential to assess the levels of depression, for an early diagnosis in medical practice. There is a consensus that in order to apply standardised scales to non-English-speaking population, appropriate cross-cultural adaptation and validation is required.[5]

The Hamilton Rating Scale for Depression (HAM-D) is a commonly used, standardised and clinician-administered scale to assess depression in Pakistan. Max Hamilton originally developed and published the scale in 1967. [6] It has 21 items with the scoring based on initial 17 items, while the remaining 4 items are indirectly related to the level of depression, but not directly. The questionnaire is designed to rate the severity of depression by probing mood, feelings of guilt, suicide ideation, insomnia, agitation or retardation, general anxiety, eating habits, weight-loss and somatic symptoms. It generally takes 15-20 minutes to complete HAM-D.[7] Ranges of severity levels of HAM-D are: 0-7 = normal, 8-16 = mild, 17-23 = moderate, and score >24 = severe depression[7]. The total 17-item HAM-D score is 50.6 The scale has demonstrated good psychometric properties in patients diagnosed with depression.[8] It is translated into various languages, including Arabic[9], Urdu[10], Turkish[11], Chinese[12], Kinyarwandan[13] and Thai.[14]

Pashto is one of the main regional languages of Pakistan, mainly spoken in the provinces of Khyber Pakhtunkhwa (KP) and Balochistan. Also, it is the official language of Afghanistan and used as a primary language by the Pashtuns around the globe, who number around 40-60 million.[15]

The current study was planned to translate and validate

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HAM-D in the Pashto language for the Pashto-speaking population of Pakistan and Afghanistan, as to the best of our knowledge, no such work has been done so far. This version can be used as a valuable measure by mental health practitioners and researchers in diagnosing depression in Pashto speaking population.

Subjects and Methods

The cross-sectional study was conducted at a tertiary care teaching hospital in Peshawar, Pakistan, from June to November 2021. After approval from the ethics review board of Prime Foundation, Peshawar, the sample was raised using purposive sampling technique from among adult Pashto-speaking patients of either gender diagnosed with depressive illness and visiting the Psychiatry outpatient department (OPD). Those with any physical/intellectual disability, suffering from severe mental illness or with substance use problems were excluded and 507 participants, with the age of 18 years and above were included in this study. Informed consent was taken from all the participants.

The HAM-D scale was translated from English to Pashto by 3 bilingual experts using the forward-backward method. No change in the translated version was made as no feedback from the sample was received. Anonymity and confidentiality were ensured before during the whole process.

Exploratory factor analysis (EFA) was used to find the factorial validity through Varimax rotation. To measure the internal consistency of the questionnaire, Cronbach's alpha reliability was used and value 0.7 or higher was considered satisfactory. Construct validity was done to find the Cronbach's alpha if the item was deleted, and the item-total correlation. Confirmatory factor analysis (CFA) was carried out to compare the fit of the factor structure. The comparative fit index (CFI), the root mean square error of approximation (RMSEA) and the normed fit index (NFI) were estimated to determine the model fit.

Data was analysed using SPSS 25 and AMOS 26. Descriptive statistics were used to analyse the basic demographic variables. EFA was carried out using Varimax rotation.[16,17] Bartlett's test of sphericity was employed to check the assumption of the normal distribution of responses.[18] Kaiser-Meyer-Olkin (KMO) test was used to check adequacy of sampling. Chi-square test was used to explore the relationship between severity levels of HAM-D with participants' education, gender, birth order and marital status. P<0.05 was considered statistically significant.

Results

Of the 507 patients with mean age 34.56+12.58 years (range: 18-75 years). The majority of the participants were females (n=317, 62.5%), and married (n=379, 74.8%). More than half of the participants were uneducated (n=308, 60.7%) followed by Matriculate and above (n=179, 35.3%); from class 6th-9th (n=16, 3.2%) and only a few were educated till the primary level (n=4, 0.8%). As per the birth order, majority of the participants were middle born (n=210, 41.4%), followed by the first born (n=204, 40.2%) and the last born (n=93, 18.3%). More than half of the participants were having severe depression (n=312, 61.5%), followed by moderate depression (n=88, 17.4%), mild depression (n=57, 11.2%), and no depression (n=50, 9.9%), respectively.

It was significant ($p < 0.001$) showing responses to be adequately distributed to analyze a potential factor structure. The distribution of responses was significant ($p<0.001$) for the analysis of potential factor structure.

According to factorial validity, four factors explained 19.7% variance for the first factor, 17.8% for the second, 11.8% for the third, and 7.67% for the fourth factor. No item was removed because all the items had a factor loading >0.3 (Table 1).

For the Pashto version of HAM-D, the Cronbach Alpha

Table-1: Factor loadings of the Pashto version of Hamilton Rating Scale for Depression (HAM-D) (n=507).

S. No	Items	Factor I	Factor II	Factor III	Factor IV
1	Item 1	.482	.363	.353	-.163
2	Item 2	.138	.042	.684	.070
3	Item 3	.110	.133	.819	-.015
4	Item 4	.115	.871	.097	-.004
5	Item 5	.149	.901	.084	.016
6	Item 6	.261	.855	.019	.030
7	Item 7	.629	.275	.312	-.075
8	Item 8	.301	.321	.342	.346
9	Item 9	.660	.141	-.023	.249
10	Item 10	.715	.049	.214	-.092
11	Item 11	.796	.180	-.053	.083
12	Item 12	.272	.411	.127	.132
13	Item 13	.514	.356	.163	.051
14	Item 14	-.172	.059	.517	.287
15	Item 15	.728	.154	-.255	.193
16	Item 16	-.024	.126	.309	.636
17	Item 17	.164	-.068	-.051	.724
Eigen Values		3.358	3.029	2.016	1.305
Percentage of variance		19.75	17.81	11.86	7.67
Kaiser-Myer Olkin Measure of Sampling Adequacy					.850
Bartlett's Test of Sphericity, Approximate Chi-Square					2991.28***

Bold: greater values of factor loadings in every item (>0.3). *** p <.001

Table-2: Item total score correlation and Cronbach's alpha for the Pashto translation of Hamilton Rating Scale for Depression (HAM-D) (n=507)..

S. No	Items	Correlation with total score	Cronbach's alpha (if the item was deleted)
1	Item 1	.559***	.829
2	Item 2	.317***	.842
3	Item 3	.372***	.841
4	Item 4	.556***	.829
5	Item 5	.599***	.826
6	Item 6	.624***	.825
7	Item 7	.608***	.827
8	Item 8	.498***	.833
9	Item 9	.490***	.833
10	Item 10	.485***	.833
11	Item 11	.564***	.830
12	Item 12	.415***	.837
13	Item 13	.550***	.830
14	Item 14	.125***	.848
15	Item 15	.427***	.837
16	Item 16	.230***	.845
17	Item 17	.141***	.845

*** = p <0.01 level; ** = p <0.05 level.

Reliability was 0.843, (ranging from .831 to .848). The high Cronbach's Alpha values suggest consistently homogenous items.

The results for item-total correlation suggest highly satisfactory correlation coefficients with the total score (p<.01). Values ranged from .12 to .62. The results are presented in Table 2.

CFA model indicated a good fit (Figure).

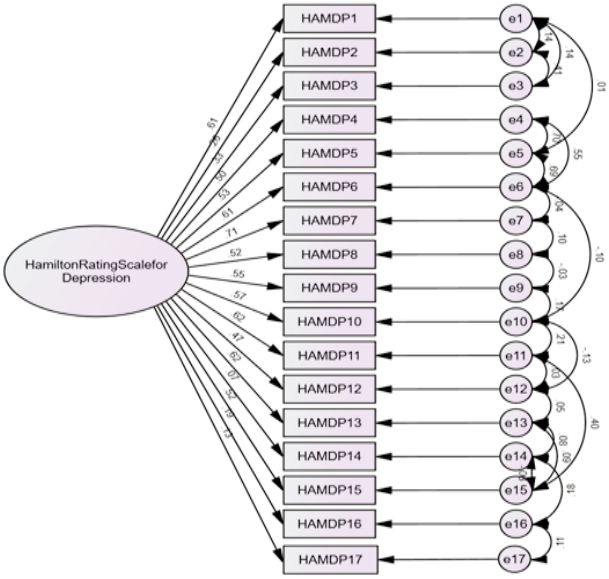

Figure: Confirmatory factor analysis (CFA) model.
X2=376.14 (df =97); GFI= .918; CFI=.904; NFI=.876; RMSEA=.075
CFI: Comparative fit index, GFI: Goodness of fit, NFI: Normed fit index, and RMSEA: Root mean square error of approximation.

The results using the chi-square test on HAM-D with demographic variables showed that no significant gender differences were found with severity levels of HAM-D (p>0.05), whereas married patients were severely depressed as compared to unmarried patients (p=0.000). Similarly, older in the birth order were significantly severely depressed as compared to younger and middle born children (p=0.000), Additionally, in education, there was a significant difference found, where uneducated was severely depressed as compared to educated patients (p=0.000). (Table 3).

Table-3: Hamilton Rating Scale for Depression (HAM-D) values in relation to demographic variables (n=507).

Variables	HAM-D				X^2
	None	Mild	Moderate	Severe	(p-value)
Gender					
Male	22(11.6%)	26(13.7%)	38 (20%)	104(54.7%)	6.03 (.110)
Female	28(8.8%)	31(9.8%)	50(15.8%)	208(65.6%)	
Marital Status					
Married	32(8.4%)	32(8.4%)	62(16.4%)	253(66.8%)	21.03***(.000)
Unmarried	18(14.1%)	25(19.5%)	26(20.3%)	59(46.1%)	
Birth Order					
Older	13(6.4%)	17(8.3%)	25(12.3%)	149(73%)	32.61***(.000)
Middle	32(15.2%)	29(13.8%)	49(23.3%)	100(47.6%)	
Younger	5(5.4%)	11(11.8%)	14(15.1%)	63 (67.7%)	
Education					
Uneducated	25(8.1%)	32(10.4%)	52(16.9%)	199(64.6%)	19.71***(.020)
1-5 class	1(25%)	2(50%)	1(25%)	0(0%)	
6-9 class	4(25%)	4 (25%)	1(6.3%)	7(43.8%)	
Matriculate (0 Levels) & above	20(11.2%)	19(10.6%)	34(19%)	106(59.2%)	

Overall the results prove that the Pashto translation of HAM-D have strong psychometrics properties.

Discussion

There has been increasing concern regarding the scientific validity of translated versions of rating scales that measure psychopathology in cross-cultural research, predominantly the self-rating questionnaires. The current study is one of the first to translate and validate an important instrument for measuring depression in Pashto language. Every item was translated not only on theoretical concepts of

symptomatology, but also on common manifestations and idioms of distress among Pashto-speaking patients with depressive illness. The study validated and translated HAM-D and showed excellent psychometric properties of the Pashto version of the standardised scale. The Cronbach alpha reliability in the study was slightly higher than the reliability of Arabic 0.759, Urdu 0.7110, Turkish 0.7511 and Chinese 0.7112 translations of HAM-D. However, the reliability score of Kinyarwanda translation of HAM-D was higher (0.92)[13], while the Thai (0.85)[14] was similar to that of the current study.

In the current study, EFA Showed Eigenvalues for the 4 factors to be 3.358, 3.029, 2.016 and 1.305. A study at the University of Pennsylvania conducted EFA on 5-factor solution with Eigenvalues of 8.22, 4.34, 2.32, 1.95, and 1.49.[19] However, in the current study, total percentage of variance generated from the four EFA factors was 53.3%, which is almost similar and in line with the Chinese translation of HAM-D (52.6%).[12] Similarly, EFA showed acceptable and good factor loading on each item, which is in line with an earlier study.[13] A study conducted on HAM-D found the total percentage of variance generated from 6 factors as 59.19%, which is higher than the current study.[20] A study in Wuhan, China also found a slightly higher percentage of variance in EFA (54.68%) than the current study.[21] However, a study reported 37.5% variance using a 2-factor model, which is lower than the variance in the current study.[22]

For CFA, the internal structure of the equation for HAM-D was found to be a good fit and adequate about a single construct, depression, which is in line with earlier findings.[23] In the current study, all measuring items on CFA had satisfactory factor loadings. Item 17 had a smaller factor loading, which suggested a poorer performance. This is in line with the findings of a study which conducted CFA with smaller factor loading on item 17 only.[13] In the current study, the CFI in CFA favoured the results of a study conducted in China (0.93).[21]

In the present study, gender was not a significant factor, which is in line with earlier findings[24] even though there have also been findings suggesting that females had significantly higher scores on HAM-D compared to the males.[11,25] The current study found a significant difference in terms of education, which is differently described in a study on Lebanese subjects with depressive illness[26]. The variation may be explained by the study samples, as the majority of the current sample consisted of uneducated people. Also, higher level of education might help in understanding the depressive condition, which may lead to early diagnosis and treatment.[26] The illiteracy rate was slightly higher in the current study, which was also the case in an earlier study conducted in Pakistan.[3] In the current study, only 11% subjects had mild depression, while 61.5% had severe depression. A study in Rwanda reported 13% mild depression and 86% severe depression.[13]

Conclusion

The Pashto version of HAM-D was found to be a reliable instrument with promising psychometric properties to measure depression. It can be used in clinical settings

Limitations: Our study participants were recruited from a single clinical centre, so it may not be generalized to the general population. More studies are needed on a community-based sample to authenticate our findings.

Data Access: All the data produced and analyzed during the study are included in the study. Any queries raised should be forwarded to the corresponding author.

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Conflict of Interest: None.

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Research Ethics: Verbal informed consent was taken from the participants. The study was approved by the Institutional Review Board of Prime Foundation (PRIME/IRB/2020-270).

Author Contributions: MI: Supervised the whole process of the study from the conception to finalization and critically reviewed the manuscript. MRS: Planned the study, helped in the write up of the manuscript, and also helped in data collection, analysis and final production of results. Both the authors made significant intellectual contribution to the study.

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