العنوان:	The Structure of the Hamilton Depression Rating Scale HDRS-17 - A Confirmatory Factor Analysis
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Table II : The Goodness-of-Fit Statistics of the Five Factor Models

		Steiger-Lind RMSEA index			Adjustment Population Gamma Index		
Model	Discrepancy Function	Lower bound of 90% CI	Point estimate	Upper bound 90% CI	Lower bound 90% CI	Point estimate	Upper bound 90% CI
6-factor model	1.31	0.00	0.031	0.062	0.94	0.98	1.00
5-factor model	2.03	0.015	0.015	0.075	0.91	0.96	1.00
4-factor model	1.4	0.00	0.04	0.067	0.92	0.97	1.00
3-factor model	1.23	0.015	0.054	0.081	0.90	0.96	1.00
2-factor model	1.08	0.038	0.069	0.095	0.88	0.93	0.98

Table 1: The Structure of the HDRS-17

6-factor model		5-factor model		4-factor model		3-factor model		2-factor model	
Factor 1		**Factor 1**		**Factor 1**		**Factor 1**		**Factor 1**	
Retardation	0.81	Retardation	0.79	Depressed mood	0.79	Depressed mood	0.77	Depressed mood	0.76
Depressed mood	0.74	Depressed mood	0.77	Retardation	0.76	Retardation	0.71	Insomnia, early	0.66
Guilt	0.65	Guilt	0.61	Guilt	0.58	Insomnia, early	0.63	Retardation	0.63
Interests (work)	0.44	Interests (work)	0.53	Interests (work)	0.50	Guilt	0.59	Interests (work)	0.52
Agitation	-.35	**Factor 2**		Hypochondriasis	-.32	Interests (work)	0.45	Guilt	0.44
Insomnia, early	0.32	Somatic, Gi	0.77	Insomnia, early	0.45	**Factor 2**		Insomnia, late	0.41
Factor 2		Somatic, general	0.68	**Factor 2**		Interests (work)	-.40	Weight	0.37
Interests (work)	0.33	Anxiety, somatic	0.56	Somatic, Gi	0.78	Somatic, Gi	0.64	Anxiety, psychic	0.35
Weight	0.78	Hypochondriasis	0.51	Somatic, general	0.62	Hypochondriasis	0.63	**Factor 2**	
Insomnia, late	0.61	**Factor 3**		Anxiety, somatic	0.47	Somatic, general	0.51	Insomnia, early	0.30
Agitation	0.54	Weight	0.75	Hypochondriasis	0.44	Anxiety, somatic	0.46	Interests (work)	-0.32
Hypochondriasis	-.38	Insomnia, late	0.65	Suicide	-.36*	Suicide	.45	Insomnia, late	0.34*
Factor 3		Agitation	0.60	Insomnia, middle	0.48	Anxiety, psychic*	0.41	Somatic, Gi	0.58
Hypochondriasis	0.37	**Factor 4**		**Factor 3**		Weight	-.31	Hypochondriasis	0.57
Somatic, general	0.75	Insomnia, late	0.35	Hypochondriasis	0.33	**Factor 3**		Anxiety, somatic	0.53
Somatic, Gi	0.74	Anxiety, psychic	0.81	Anxiety, psychic	0.75	Insomnia, late	0.67	Somatic, general	0.52
Insomnia, middle	0.54	Insomnia, early	0.68	Insomnia, middle	-.60	Agitation	0.65	Anxiety, psychic	0.46
Factor 4		Suicide	-.53	Insomnia, early	0.59	Weight	0.64	Libido	0.36
Insomnia, late	0.33	**Factor 5**		Insight	0.37*	Libido	0.32*	Suicide	-0.36
Anxiety, psychic	0.78	Suicide	0.46	Libido	032*				
Insomnia, early	0.72	Insomnia, middle	-.70*	**Factor 4**					
Suicide	-.58	Insight	0.67*	Suicide	0.32*				
Factor 5		Libido	0.31*	Weight	0.74				
Insomnia, late	0.34			Agitation	0.61				
Hypochondriasis	0.31			Insomnia, late	0.61				
Suicide	0.35*								
Anxiety, somatic	0.69								
Libido	0.63								
Factor 6									
Interest (work)	0.31*								
Agitation	0.44								
Insomnia, middle	-.50								
Insight	0.80								

* nonsignificant contribution items loadings less than 0.30 were omitted

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ملخص

أجريت هذه الدراسة على عينة من المرضى (عدد ١٠٠) المصابون بمرض الاكتئاب حسب التصنيف العالمي العاشر للأمراض وذلك من أجل معرفة حقيقة عدد المحاور الكامنة لمقياس هاملتون للاكتئاب. لقد تمت المقاربة بين عدة نماذج من التركيبة المعولية لمقياس هاملتون وبينت الدراسة أن مقياس هاملتون يتكون من عدة محاور أو آليات صغرى لقياس شدة الاكتئاب الشديد وغير الشديد .

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the Hamilton scale from two groups of patients and concluded that there was no way to extract a general factor. Along the same lines Gibbons et al[8] evaluated the empirical criticism of the psychometric properties of the Hamilton depression rating scale by undertaking an internal construct validity evaluation. The analysis yielded a five-dimensional solution. The results were consistent with other published factor analytic studies and provide further justification for thinking that the HDRS total score is a week index of depressive syndrome severity. Although there is no consensus of opinion about how depression should be classified[15], our study reveals that our patients can be classified into four subgroups which then could be grouped into two main syndromes. The four factor model distinguishes between two melancholic subtypes. The first subtype could be called retarded melancholia and is characterized also by early insomnia. guilt. depressed mood and loss of interests. while the second subtype that can be called agitated melancholia which is associated with weight loss and early morning wakening. The same factor model distinguishes also between somatic depression and anxiety depression. The latter two types of depression appear to be related since the three factor model allowed them to merge into a single component. Fleck et al[2] reported three factor solutions of the HDRS-17 corresponding to the core symptoms of depression. anxiety and insomnia. Marcos[7] also reported three factor solutions corresponding to melancholic depression, insomnia and somatic and psychic anxiety. It is interesting to note that the three factor model solution sheds light on the independence of the two melancholic subtypes and related two nonmelancholic subtypes that merged in the 3-factor model solution. However, the two melancholic subtypes merged together in the 2-factor model solution. The item agitation lost its significant contribution in the factor component that corresponded to melancholia. It is interesting to note that agitation is not included in the diagnostic criteria of melancholia by the Newcastle Scale Version 11[16,17]. Although the HDRS is not a diagnostic instrument, our latent analysis of the structure of the HDRS-17 suggests that our depressed patients can be broadly classified into main categories. The first one accords with melancholia and the second one accords with atypical depression (nonmelancholic depression). Guelfi et al[18] reported two factor solutions of the development version (NIMH 67) of the Hamilton depression rating scale with 26 items and thus provide further support to our findings. We conclude that the Hamilton depression rating scale is not unidimensional but it can be defined as a two or three dimensional scale. However, it remains to be seen which subscale would be used as a valid measure of a depressive syndrome severity.

view the tested five factor models appear to fit the data adequately and there are no great differences between them in this regard. However, guided by the discrepancy function, which is the measure of the badness of fit, it transpires that the 4-factor and the 3-factor and the 2-factor model appear to fit the data better than the 6-factor and 5-factor models. From the psychopathological point of view. Our data (final model) indicate that there are two main subscales for the measurement of severity of the depressive syndromes among our patients. First subscale appear to measure the severity of depression in patients whose depressions are characterized particularly by the presence of cognitive (depressive) symptoms such as depressed mood, retardation, guilt, loss of interests, delayed insomnia, and weight loss. Second subscale appears to measure the severity of depression inpatients whose depressions are characterized particularly by the presence of somatic symptoms, somatic anxiety, psychic anxiety low scores on suicide item, less likely to lose interests and to lose weight. It appears that libido and insight are the items, which do not contribute significantly in the latent structure of the HDRS-17 items among our patients.

Discussion

Ordinary principal component analysis is a descriptive method and is used to generate hypotheses rather than to confirm them. To the best of our knowledge this is the first study that utilises pathway analysis to evaluate the appropriateness of factor model solutions obtained by principal component or factor analysis. It should also be pointed out that the adopted goodness-of -fit statistics in this study are not negatively biased by the sample size. This gives us more confidence in our results and allow us to choose the best factor-model solution which is amenable to sound clinical interpretation. The goodness of fit of each factor model was tested first and clinical interpretation of each factor model was then performed. The findings of this study suggest that the HDRS-17 is probably a two dimensional scale depending on the final chosen solution. If depression is a heterogeneous disorder, it would be a serious mistake to generate "global depression severity" score summarizing the severity of markedly different cognitive, somatic and perhaps anxiety syndromes with a single number. In this case, one patient could achieve a high severity score by virtue of severe cognitive symptoms alone, another by a virtue of severe somatic symptoms alone, and a third by virtue of severe anxiety symptoms alone; but their identical severity scores would make them appear equivalent. As depressive disorder is probably a multidimensional phenomenon, a scale with good conceptual coverage ought to be multidimensional, and ought to generate a unidimensional subscale scores representing each of the salient factors so that patients can be characterized and compared on each factor, and so the relative utility of subscale versus total scores can be compared. Maier et al[14] reported the results of factor analysis of

generated by factor analyses of the Hamilton depression rating scale by utilizing the structural equation models or confirmatory factor analysis and to test the significant contribution of each item of the HDRS-17 in the yielded models.

Material and Methods

Detailed description of subjects and their selection have been described elsewhere[10]. In brief, the target population of this study were the referred patients with depressive illnesses to Al Ain medical district. Patients with alcohol/drug abuse and organic conditions as comorbid diagnoses were excluded from the study. Then patients fulfilling the ICD-10 Diagnostic Criteria for Research[11] were recruited in this study. All patients were then rated on the 21-items Hamilton Depression Rating Scale[6]. The first 17 items were subjected to principal component analysis using the SPSS version 7.5 under windows. In order to test the appropriateness of the number of components (factors), five factors solutions were sought. The yielded models were as follows: 6-factor model, 5-factor model, 4-factor model, 3-factor model and 2-factor model. Each model was reevaluated using the confirmatory factor analysis. The module SEPATH in Statistica version 5 under windows was utilized to run the confirmatory factor analysis. The goodness-of-fit statistics[12] for each model were: discrepancy function (higher values indicate poor fit), Steiger-Lind RMSEA and adjusted population gamma indices. The last two have replaced the old statistic Joreskog AGFI[13] which tends to reward large sample sizes. Both statistics do not depend on sample size. Low value (as low as 0.08) of Steiger-Lind index indicates reasonable fit and less than 0.05 indicates close fit. High value of adjusted population gamma index (as high as 0.95) indicates a good fit. The significant contribution of each item in each model was also tested. Each item whose parameter in the model was not different from zero was considered to have no significant contribution and could be omitted from the model without changing the values of the goodness-of-fit statistics of the respective model. Having estimated the goodness of fit of each model, the clinical interpretation of each model was attempted. The final accepted model from the statistical and clinical point of view was used as a template to construct subscales which were supposed to measure the severity of the depressive syndromes.

Results

The sample consisted of 49 males and 51 female patients. The mean ages of patients was 34.6±11.4 years. The distribution of patients by ICD-10 psychiatric diagnoses were as follows: depressive episode 45%, recurrent depressive disorder 28%, bipolar depression 11%, dysthymia 9% and adjustment disorder with depressed mood 7%. Table 1 shows the five factor-models and the items that do not contribute significantly in each factor-model. Table 2 shows the goodness-of-fit statistics for each factor model. From the statistical point of

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The Structure of the Hamilton Depression Rating Scale (HDRS-17 - A Confirmatory Factor Analysis

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تركيبة مقياس هاملتون للاكتئاب :- التحليل المعولي التثبيتي

يسرية أمين، توفيق درادكه، عماد حمدي، محمد أبو صالح

ABSTRACT

One hundred patients fulfilling the ICD-10 criteria for depression were rated on the Hamilton Depression Rating Scale. The first 17 items of the scale were subjected to principal component analysis with varimax rotation. Five factor solutions were sought corresponding to 6-factor model, 5-factor model, 4-factor model, 3-factor model and 2-factor model. These factor models were then subjected to confirmatory factor analysis utilizing the structural equation models (path analysis) in order to evaluate the goodness of fit of the yielded models. The 4-factor, 3-factor and 2-factor models appear to be the most appropriate models of the latent structure of the HDRS-17. The findings suggest that the scale is multidimensional with at least two subscales measuring the severity of the melancholic and nonmelancholic depressions respectively.

HDRS/ latent structure/ confirmatory factor analysis

Introduction

The Hamilton Depression Rating Scale (HDRS) is a standardised rating scale for the measurement of severity of depression[1]. One important aspect concerning HDRS is still controversial. It is the existence or not of a general factor of depression (does a total score represent or not a global severity index of depression[2]. Some investigators, for example, demonstrated in a series of investigations that the HDRS is not a good objective measure of depression severity because it does not define a unidimensional depressive state and does not correlate well with clinical assessments[3-5]. There are many factor analytic studies of the HDRS-17, but none of their findings confirmed the presence of a general factor. On the contrary the majority revealed three to six factors escaping meaningful interpretations. The few factorial analyses of reference are those of the[6,8,2,9,10]. The purpose of this study was to evaluate the appropriateness of factor models